Reciprocal Impacts Between Creativity, Innovation, and Entrepreneurship (CIE) and the Environment

Lead Guest Editor: Tsai Fu-Sheng
Guest Editors: He Jianhong and Ping Gao

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Tongzhang Zheng, USA

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Qin Yang ⓘ, Jian Li, and Youlin Tang

Retraction

Retracted: The Dialectic and Coupling of Three Paradigms in the Process of Art Rural Construction: Environment, Culture, and Industry

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

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We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] X. Fan and X. Zhong, "The Dialectic and Coupling of Three Paradigms in the Process of Art Rural Construction: Environment, Culture, and Industry," *Journal of Environmental and Public Health*, vol. 2022, Article ID 1864916, 9 pages, 2022.

Retraction

Retracted: Design of Personalized Ideological and Political Education Resource Recommendation System in the Online Education Platform in the Network Environment

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References

[1] T. Yang and Z. Duan, "Design of Personalized Ideological and Political Education Resource Recommendation System in the Online Education Platform in the Network Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 3845749, 12 pages, 2022.

Hindawi

Retraction

Retracted: A Preliminary Study on the Dramatic Factors of Ancient Chinese Poetry under the Changing Geographical Environment

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[1] Y. Liu, "A Preliminary Study on the Dramatic Factors of Ancient Chinese Poetry under the Changing Geographical Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 4220059, 9 pages, 2022.

Retraction

Retracted: Exploring the Independent Learning of Music Students in Higher Teacher Training Colleges in a Pluralistic Network Environment

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[1] L. Zhang, "Exploring the Independent Learning of Music Students in Higher Teacher Training Colleges in a Pluralistic Network Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 5024006, 9 pages, 2022.

Hindawi

Retraction

Retracted: Rural Workplace Sustainable Development of Smart Rural Governance Workplace Platform for Efficient Enterprise Performances

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[1] Y. Wu and W. Ma, "Rural Workplace Sustainable Development of Smart Rural Governance Workplace Platform for Efficient Enterprise Performances," *Journal of Environmental and Public Health*, vol. 2022, Article ID 1588638, 11 pages, 2022.

Retraction

Retracted: Research on the Implementation Path of Ideological and Political Education in Private Colleges and Universities under the Network Environment

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[1] D. Luo, "Research on the Implementation Path of Ideological and Political Education in Private Colleges and Universities under the Network Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 2830388, 12 pages, 2022.

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Retracted: Exploration and Analysis of Educational History from the Perspective of Educational Environmental History and Environmental History

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[1] W. Li and L. Li, "Exploration and Analysis of Educational History from the Perspective of Educational Environmental History and Environmental History," *Journal of Environmental and Public Health*, vol. 2022, Article ID 3366343, 11 pages, 2022.

Retraction

Retracted: Exploring Evaluation of Enterprise Economic Benefits Using Big Data

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[1] X. Liu and Y. Li, "Exploring Evaluation of Enterprise Economic Benefits Using Big Data," *Journal of Environmental and Public Health*, vol. 2022, Article ID 1103561, 9 pages, 2022.

Retraction

Retracted: Research on the Difference between Environmental Music Perception and Innovation Ability Based on EEG Data

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[1] N. Zhang, "Research on the Difference between Environmental Music Perception and Innovation Ability Based on EEG Data," *Journal of Environmental and Public Health*, vol. 2022, Article ID 9441697, 9 pages, 2022.

Retraction

Retracted: On the Ways of Political Philosophy Innovation and Popularization under the Network Environment

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[1] Y. Ma and Q. Li, "On the Ways of Political Philosophy Innovation and Popularization under the Network Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 2201497, 9 pages, 2022.

Retraction

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[1] Y. Wu, "The Current Situation and Innovation of News Communication under the Environment of Financial Media," *Journal of Environmental and Public Health*, vol. 2022, Article ID 3440217, 10 pages, 2022.

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References

[1] X. Chen, L. Zheng, and Y. Xu, "Study on the Construction and Development Path of Gymnasiums considering Ecological Environment Restrictions," *Journal of Environmental and Public Health*, vol. 2022, Article ID 2700957, 13 pages, 2022.

Retraction

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[1] S. Ma, "The Relationship between Traditional Music in Xinjiang and the Geographical Environment of the Gobi Desert," *Journal of Environmental and Public Health*, vol. 2022, Article ID 5610363, 9 pages, 2022.

Retraction

Retracted: University Network and New Media Advertising Teaching Design Features and Influence: Environmental Perspective Analysis in Campus Humanistic Governance

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[1] J. Zhang, "University Network and New Media Advertising Teaching Design Features and Influence: Environmental Perspective Analysis in Campus Humanistic Governance," *Journal of Environmental and Public Health*, vol. 2022, Article ID 6380719, 11 pages, 2022.

Retraction

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[1] J. Guo and H. Hu, "An Analysis of Public Environment-Oriented Marxist Philosophy Content Dissemination," *Journal of Environmental and Public Health*, vol. 2022, Article ID 7873226, 9 pages, 2022.

Retraction

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Hindawi

Retraction

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Retraction

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[1] W. Zhang, "Analysis of Political Subjective Initiative and the Construction Path of Advanced Education from the Network Community Environmental Perspective," *Journal of Environmental and Public Health*, vol. 2022, Article ID 7034414, 13 pages, 2022.

Retraction

Retracted: Analysis of O2O Teaching Assistant Mode of College English in MOOC Environment

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[1] Y. Zhang, "Analysis of O2O Teaching Assistant Mode of College English in MOOC Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 8164934, 11 pages, 2022.

Retraction

Retracted: An Exploration of the Environment, Composition, and Transmission of the Development of Local Theater and Music in the Natural Environment and Folklore Activities of Tea Picking

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We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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Hindawi

Retraction

Retracted: Government Environmental Governance and Enterprise Coordinated Green Development under the Goal of "Double Carbon"

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

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[1] F. Liu, J. Jiang, and S. Zhang, "Government Environmental Governance and Enterprise Coordinated Green Development under the Goal of "Double Carbon"," *Journal of Environmental and Public Health*, vol. 2022, Article ID 6605935, 10 pages, 2022.

Hindawi

Retraction

Retracted: Promotion and Protection of Feminism Creativity for Public Environment: The Integration of Ecofeminism and Public Environment

Journal of Environmental and Public Health

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Hindawi

Retraction

Retracted: Research on the Integrated Development of Local Art Design and Art Design Education in the New Media Environment

Journal of Environmental and Public Health

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Retraction

Retracted: The Ecological Consciousness of Natural Writing in British and American Romantic Literature

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[1] Y. Jin, "The Ecological Consciousness of Natural Writing in British and American Romantic Literature," *Journal of Environmental and Public Health*, vol. 2022, Article ID 8233269, 9 pages, 2022.

Hindawi

Retraction

Retracted: Analysis of the Implementation Effect of College Curriculum Ideological and Political under the Background of Ecological Sustainable Development

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Retraction

Retracted: The Optimization Strategy of College Students' Ideological and Political Management under the Internet+ Environment

Journal of Environmental and Public Health

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[1] Y. Zhou, "The Optimization Strategy of College Students' Ideological and Political Management under the Internet+ Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 2556976, 12 pages, 2022.

Research Article

Analysis on Logistics Efficiency Measurement of New Western Land-Sea Corridor under the Background of "Double Carbon" and Ecological Environment Protection

Tingyan Zhou (ID) **and Wenxing Li**

School of Economics and Management, Beijing Jiaotong University, Beijing 100044, China

Correspondence should be addressed to Tingyan Zhou; zhouty@bjtu.edu.cn

Under the research background of ecological environment protection and "double carbon" goal, this paper applies panel data on the logistics industry from 2010 to 2019 in 12 provinces of China's new western land-sea corridor to statically measure the logistics industry's technical efficiency after taking into account the impact of different environmental elements and to analyze the dynamics trends of total factor productivity in the logistics sector. It is measured by using the three-stage SBM model and the Malmquist–Luenberger productivity index, which considers undesirable output. The findings indicate the following: (1) In the context of "double carbon," the overall technical efficiency of the logistics sector in the new western land-sea corridor seems to be relatively low; however, the average technical efficiency of the logistics sector in the southern portion of the new western land-sea corridor does seem to be higher than that of the northern part. (2) The logistics industry's technical efficiency varies greatly by region, with locations near central China having much higher technical efficiency than remote inland areas. (3) The fundamental reason for the improvement of technical efficiency in the logistics industry is pure technical efficiency, and the driving force behind the increase in total factor productivity is technological advancement. (4) Economic development, informatization development, industrial market scale, and import and export all have a substantial influence on the logistics industry's technical efficiency. Finally, depending on the findings, policy recommendations are offered.

1. Introduction

With the rapid development of China's economy, the pollution and destruction of the ecological environment have been unable to make the economy sustainably developed, therefore, China has formulated the corresponding implementation of ecological protection. A major strategic objective for high-quality economic development and environmental sustainability in China is to accomplish the aim of "peak carbon dioxide emissions and carbon neutrality" [1]. During the fourteenth Five-Year Plan phase (2021–2025), the logistics industry needs to shoulder the responsibility of reducing emissions while developing at a high quality. The logistics industry's efficiency is a comprehensive indicator to measure the whole logistics operation and resource allocation in regional logistics development. In the regional coordinated development pattern based on the external environment, it is especially crucial to explore the logistics industry efficiency, enhance the allocation efficiency of input factors in the logistics industry, and enable the growth of "high quality" with "good efficiency."

"Increase the efficiency of the logistics sector by strengthening the construction of transport infrastructure in western China, synergizing with the expansion of the Yangtze River Economic Belt," according to the comprehensive plan for the new western land-sea corridor [2]. The new western land-sea corridor connects the Maritime Silk Road with the Overland Silk Road, offering a crucial commercial and logistical corridor for the opening up of western China's inland areas. The new western land-sea corridor's competitive development index of 113.2 in

2020 demonstrates a strong development trend as well as a considerable increase in the logistics industry's service and operational efficiency [3]. The container throughput of Beibu Gulf seaport in Guangxi has increased by 64% year-on-year, from 3.08 million TEUs in 2018 to 5.05 million TEUs in 2020. Rail-sea trains in the western area have climbed by 299 percent year-on-year, from 1,154 trains in 2018 to 4,607 trains in 2020 [4]. At the same time, with the fast expansion of the logistics sector, the energy consumption of logistics industry will increase at a high speed. Statistics on the overall energy consumption of the logistics sector in 12 provinces of the new western land-sea corridor increased from 73,272,801 tons of standard coal in 2010 to 101,375,500 tons of standard coal in 2019, with 3.67 percent average annual growth rate.

In the context of "double carbon," can logistics sector in the new western land-sea corridor expand at an efficient and sustainable speed? Are all kinds of input resources adequately distributed and utilized? Is there a significant difference in the growth of the logistics sector among provinces in the new western land-sea corridor? This paper investigates the growth of the logistics sector along the new western land-sea corridor to show the extent to which the external environmental variables influence logistics industry's efficiency, and it serves as a reference for the improvement of logistics sector's efficiency from the perspective of rational resource allocation. Furthermore, it serves as a decision-making foundation for the construction of China's international commerce corridor with the shortest transportation time to ASEAN countries.

2. Literature Review

Charnes et al. [5], used data envelope analysis (DEA) to evaluate the relative efficiency of decision-making units (DMUs) with multiple inputs and multiple outputs. DEA is a nonparametric linear programming approach with a flexible calculation mechanism. It is not required to perform a certain type of production function and allows the existence of inefficiencies. Most study adopts DEA to assess the efficiency of the regional logistics sector. Tian and Li [6] utilized the DEA-Malmquist model to assess the logistics sector's total factor productivity in 30 provinces of China between 1999 and 2006 and found that there were disparities in total factor productivity and scale inefficiency among the provinces. Markovits-Somogyi and Bokor [7] employed DEA and DEA-PC to assess the logistics industry efficiency in 29 European nations, both methods are considered more appropriate after comparison. Yu and Qian [8] analyzed the logistics industry's technological efficiency in 11 provinces of the Yangtze River Economic Belt between 2006 and 2015 through the DEA-Malmquist method, concluding that it was generally not high, with the eastern area being better than the western area, and that the logistics industry's efficiency increase was primarily influenced by economic growth, informatization development, and degree of openness. Lei et al. [9] studied the technical progress index of China's 49 listed logistics businesses from 2008 to 2017 and concluded that the logistics sector's technical progress had a major

beneficial influence on the skill structure of employment. Although DEA has unique advantages in measuring the input-output efficiency of DMUs, it does not account for the effect of random errors on output, which easily leads to errors in calculation results.

Stochastic frontiers analysis (SFA) is a standard representation of the parametric method with the benefit of utilizing a production function to evaluate the input-output efficiency while accounting for stochastic error. Fan and Wang [10] measured the service efficiency of 11 logistics corridors in China from 2000 to 2013 and found that the logistics corridors differed significantly in time and space, with lower service efficiency when running through western China or across eastern, central, as well as western China. Zhang et al. [11] examined the technological efficiency of low-carbon development in China's logistics sector from 2007 to 2016, and believed that the overall situation was low and the regional differences were obvious. The proportion of secondary sector in the provincial GDP and the average size of logistics enterprises have a favorable influence on the improvement of logistics industry's technical efficiency, while financial support and energy consumption have a negative influence on technical efficiency, and the impacts of environmental regulation are not obvious. Han and Liu [12] investigated the efficiency of 80 Chinese logistics listed enterprises from 2013 to 2017, concluding that total logistics company efficiency is increasing, and the average technical efficiency of enterprises in the eastern area is higher than enterprises throughout the western and central areas. Although the influence of random error is considered in the SFA model, there is no precise theoretical support when choosing the production function, and there are strict assumptions about the distribution of inefficiency terms [13].

A three-stage DEA model was proposed, which integrates the benefits of parametric and nonparametric analysis methods, excludes the effects of external environmental factors and statistical noise on efficiency evaluation, and allows measurement results to more accurately describe the internal managerial level of the decision-making unit [14]. According to Zhong [15], when the influence of external environmental factors and statistical noise are removed, the technological efficiency, pure technological efficiency, and scale efficiency of China's logistics sector change significantly. J. Zhang and J. Zhang [16] examined the logistics industry's efficiency in 31 provinces in China from 2010 to 2014 and discovered that the scale efficiency of logistics industry was increasing as a whole, but the degree of logistics operation and management restricted the logistics expansion. According to Zhang et al. [17], from 2009 to 2014, the overall logistics sector's efficiency of the New Silk Road Economic Belt at home and abroad was not high, with large differences in logistics industry's efficiency among regions being more influenced by scale efficiency. Mei et al. [18] evaluated the logistics sector efficiency in East China between 2012 and 2016 and concluded that the logistics sector was in a state of increasing scale efficiency on the whole. Increasing the retail volume of social consumer goods might enhance the logistics sector's efficiency. Yang [19] found that Jiangsu province's logistics industry performed well overall

under low-carbon constraints from 2007 to 2016 and scale efficiency was the primary problem restricting the logistics industry's efficiency. Zhang et al. [20] analyzed the logistics sector's efficiency in 19 provinces of the Yangtze River Great Protection Region between 2013 and 2017 and found that the growth of the logistics sector in this area was unbalanced, with scale efficiency leading to the largest increase in technical efficiency. The three-stage DEA only evaluates the influence of desirable output on efficiency but does not consider the impact of undesirable output on efficiency. It does not objectively reflect the true level of industry management and thus measure the efficiency of the logistics industry.

Tone [21] proposed a slacks-based measure (SBM) including undesirable outputs relying on DEA improvement, thereby enhancing the scientific reliability of the efficiency measurement. Liu and Guan [22] argued that the logistics industry in China's 30 provinces was generally inefficient under low-carbon constraints from 2003 to 2014, with the inefficiencies concentrated in western China. Deng and Shen [23] evaluated the logistics industry's efficiency in 30 Chinese provinces subject to carbon emission constraints in 2016 and reported that there were significant local differences in China. The fundamental restriction to logistics development was inefficient scale, and energy structure was negatively connected to logistics sector efficiency. Zheng et al. [24] used the SBM in conjunction with hierarchical regression to measure the logistics industry's efficiency in 18 Chinese provinces bound by carbon emission constraints from 2007 to 2017, concluding that the efficiency gap across eastern and western regions had narrowed, with external variables positively influencing efficiency having shifted from the degree of openness prior to 2013 to regional economic development. Although a nonradial, nonoriented SBM with undesirable output can avoid the problems of slack and single output variable, it cannot accurately and objectively reveal the efficiency of the logistics industry without distinguishing internal managerial inefficiencies from external environmental influences and statistical noise.

In conclusion, although the three-stage DEA may remove the effects of external environment variables and statistical noise from efficiency evaluation, it cannot fully account for the slack in input-output variables and undesirable output, which leads to efficiency measurement error. The slack problem can be avoided by considering the undesirable output of the SBM model but not the interference of external environmental variables and statistical noise. Most studies have been undertaken on China as a whole, or on a specific province, or on a regional economic belt. Results vary, and systematic studies of the new western land-sea corridor are scarce. Based on this, this paper expands as follows:

(1) In terms of the research methodology, the technical efficiency of the logistics industry in 7 provinces, 4 autonomous regions, and 1 municipality (henceforth referred to as 12 provinces) along the new western land-sea corridor in China from 2010 to 2019 was analyzed using a three-stage SBM model considering nonradial, nonoriented, and undesirable output. In

order to complete the multidimensional extension of the study, the Malmquist–Luenberger index is used to dynamically analyze the fluctuation of total factor productivity (TFP) in the logistics sector.

(2) In terms of research content, this study uses the panel data to make an empirical analysis of the logistics industry in 12 provinces of the new western land-sea corridor from 2010 to 2019, to assess the overall efficiency of the logistics sector, identify the main affecting factors, and analyze the different regional situations to expand the study of logistics industry's efficiency in less developed regions.

Figure 1 shows the research frameworks of this paper.

3. Methodology

3.1. Three-Stage Slacks-Based Measure (SBM) Including Undesirable Output

3.1.1. The First Stage: The Initial Slacks-Based Measure (SBM) Including Undesirable Output.
Assuming the system has n DMUs, each of which consumes input index $x \in R^m$, produce desirable output index $y^g \in R^{s_1}$, undesirable output index $y^b \in R^{s_2}$, and hypothesis matrix $X = [x_1, \cdots, x_n] \in R^{m \times n} > 0, Y^g = [y_1^g, \cdots, y_n^g] \in R^{s_1 \times n} > 0, Y^b = [y_1^b, \cdots, y_n^b] \in R^{s_2 \times n} > 0$.

$$\rho = \min \frac{1 - (1/m)\sum_{i=1}^{m} s_i^- / x_{i0}}{1 + (1/s_1 + s_2)\left(\sum_{r=1}^{s_1}\left(s_r^g / y_{r0}^g\right) + \sum_{r=1}^{s_2}\left(s_r^b / y_{r0}^b\right)\right)},$$

$$\text{subject to} \begin{cases} x_0 = X\lambda + s^-, \\ y_0^g = Y^g\lambda - s^g, \\ y_0^b = Y^b\lambda + s^b, \\ s^- \geq 0, s^g \geq 0, s^b \geq 0, \lambda \geq 0. \end{cases} \quad (1)$$

where ρ is the efficiency and $0 \leq \rho \leq 1$. When $\rho = 1, s^-, s^g, s^b$ are all zero, and DMU is valid, $s^- \in R^m$ is the input slack variables, $s^g \in R^{s_1}$ is the desirable output slack variable, $s^b \in R^{s_2}$ is the undesirable output slack variable, and $\lambda \in R^n$ is the weight [21].

3.1.2. The Second Stage: Stochastic Frontiers Analysis (SFA).
The primary purpose of the second stage is to divide the input slack variable from the first stage into three variables: internal managerial inefficiency, external environmental influences and statistical noise, and to reduce the effects of the environmental and statistical noise on efficiency evaluation.

Firstly, the dependent variables are the input slack elements obtained in the first phase, and the independent variables are the external environmental variables, which are regressed by using a Stochastic frontier analysis (SFA) to generate new input variables.

$$s_{ni} = f^n\left(z_i; \beta^n\right) + v_{ni} + \mu_{ni}, n = 1, \cdots, N, i = 1, \cdots, I, \quad (2)$$
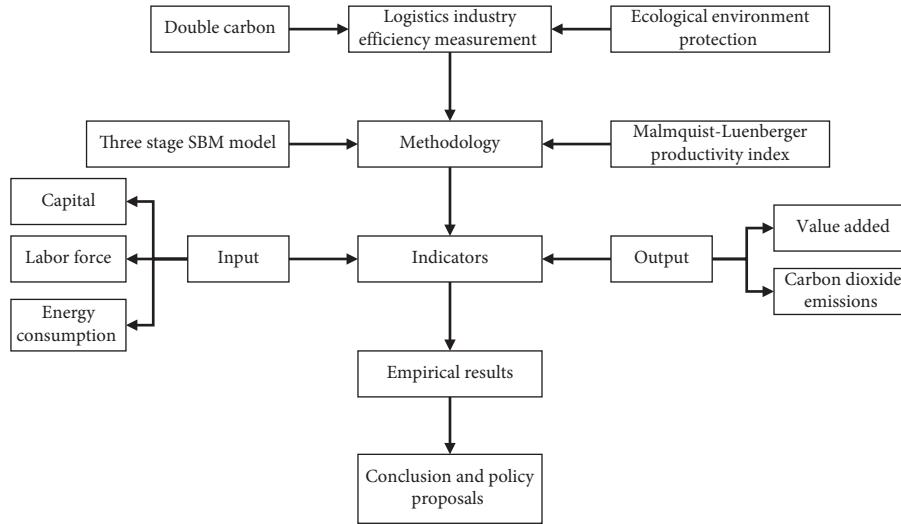
FIGURE 1: The research frameworks.

where s_{ni} is the slack variable of the ith DMU's nth input, $f^n(z_i; \beta^n)$ indicate the effect of external environmental variable on input slack variables, $z_i = (z_{1i}, z_{2i}, \cdots, z_{ki})$ are k external environmental variables, β^n are the parameter vectors, v_{ni} represent statistical noise, and μ_{ni} represent inefficient management.

Secondly, the SFA results are used to adjust input variables for all DMUs to a more favorable external environment and to eliminate the impact of external environmental variables and statistical noise on efficiency measurements.

$$x_{ni}^A = x_{ni} + \left[\max \left(f \left(z_i; \widehat{\beta}^n \right) \right) - f \left(z_i; \widehat{\beta}^n \right) \right] \\ + \left[\max \left(\widehat{v}_{ni} \right) - \widehat{v}_{ni} \right], n = 1, \cdots, N, i = 1, \cdots, I, \tag{3}$$

where x_{ni}^A is the modified input variable and x_{ni} is the observed input variable, $[\max (f(z_i; \widehat{\beta}^n)) - f(z_i; \widehat{\beta}^n)]$ indicates modification to external environmental variables, and $[\max (\widehat{v}_{ni}) - \widehat{v}_{ni}]$ represents the adjustment of statistical noise.

3.1.3. The Third Stage: The Adjusted Slacks-Based Measure (SBM) Considering Undesirable Output.
By replacing the observed input variable x_{ni} in the first stage with the modified input variables x_{ni}^A calculated by formula (3), the recalculated efficiency can more properly represent the efficiency of the logistics sector.

When measuring the efficiency of the logistics industry in the 12 provinces of the new western land-sea corridor, the advantages of the three-stage SBM model are as follows: First, by reducing the effects of external environmental variables and random errors and taking into account undesirable output, the third-stage results can more precisely reflect the actual efficiency of DMUs. Second, it is an empirical study on the impact of external environmental variables on efficiency, which can quantify the degree and mechanism of environmental variables.

3.2. Malmquist–Luenberger Productivity Index.
By replacing the distance function in the Malmquist productivity index with the directional distance function, Chung et al. [25] introduced a Malmquist–Luenberger productivity index that relies on the directional distance function to calculate the total factor productivity of undesirable output, including carbon dioxide emissions.

$$ML_t^{t+1} = \left[\frac{\left(1 + \overrightarrow{D}_0^t \left(x^t, y^t, b^t, -b^t \right) \right)}{\left(1 + \overrightarrow{D}_0^t \left(x^{t+1}, y^{t+1}, b^{t+1}; y^{t+1}, -b^{t+1} \right) \right)} \times \frac{\left(1 + \overrightarrow{D}_0^{t+1} \left(x^t, y^t, b^t; y^t, -b^t \right) \right)}{\left(1 + \overrightarrow{D}_0^{t+1} \left(x^{t+1}, y^{t+1}, b^{t+1}; y^{t+1}, -b^{t+1} \right) \right)} \right]^{1/2}, \tag{4}$$

where the *ML* productivity index represents the change in DMU's total factor productivity between period t and period $t + 1$. If $ML > 1$, the total factor productivity rises, if $ML < 1$, the total factor productivity falls, and if $ML = 1$, the total factor productivity remains unchanged.

The *ML* productivity index can also be separated into efficiency change index MLEC and technology change index MLTC between period t and period $t + 1$.

$$ML_t^{t+1} = MLEC_t^{t+1} \times MLTC_t^{t+1},$$

$$MLEC_t^{t+1} = \frac{1 + \overrightarrow{D}_0^t\left(x^t, y^t, b^t, -b^t\right)}{1 + \overrightarrow{D}_0^{t+1}\left(x^{t+1}, y^{t+1}, b^{t+1}; y^{t+1}, -b^{t+1}\right)},$$

$$MLTC_t^{t+1} = \left[\frac{\left\{(1 + \overrightarrow{D}_0^{t+1}\left(x^t, y^t, b^t, -b^t\right)\right\}}{\left\{(1 + \overrightarrow{D}_0^t\left(x^t, y^t, b^t, -b^t\right)\right\}} \times \frac{\left\{1 + \overrightarrow{D}_0^{t+1}\left(x^{t+1}, y^{t+1}, b^{t+1}; y^{t+1}, -b^{t+1}\right)\right\}}{\left\{(1 + \overrightarrow{D}_0^t\left(x^{t+1}, y^{t+1}, b^{t+1}; y^{t+1}, -b^{t+1}\right)\right\}}\right]^{1/2},$$

(5)

where MLEC represents efficiency change between period t and period $t + 1$, MLEC > 1 represents an increase in technical efficiency, MLEC $= 1$ indicates the unchanged technical efficiency, and MLEC < 1 signifies a decline in technological efficiency. MLTC denotes technology transfer between period t and period $t + 1$, MLTC > 1 represents technical progress, MLTC $= 1$ denotes no technical progress, and MLTC < 1 indicates technical regression.

The efficiency change index MLEC may also be subdivided into two components: the pure technological efficiency change index MLPTEC and the scale efficiency change index MLSEC.

$$\begin{aligned}ML_t^{t+1} = MLEC_t^{t+1} \times MLTC_t^{t+1} = MLPTEC_t^{t+1} \\ \times MLSEC_t^{t+1} \times MLTC_t^{t+1}.\end{aligned}$$

(6)

The Malmquist–Luenberger productivity index is actually a modified Malmquist index. The traditional Malmquist index is based on the output distance function, but the Malmquist–Luenberger index is based on the directional distance function, which can improve the good output while reducing the bad output, and the output distance function cannot be realized.

4. Indicators and Data

The 2006 China Third Industrial Statistics Yearbook shows that the value added of transport, storage, and postal services account for more than 80 percent of the logistics sector's value added. Therefore, the existing research essentially uses the indicators related to transportation, warehousing, and postal services to represent the logistics industry, and this method has also been adopted in this paper. The input indicators are defined to include capital, labor, and energy consumption, while the output indicators include industry value added and carbon dioxide emissions. Indicators and data processing are described below.

4.1. Input Indicators. The fixed asset investment of the whole society in the logistics industry is chosen as the capital indicator, and the capital stock of the logistics industry is calculated by a perpetual inventory system. The formula for calculation is as follows:

$$K_{it} = K_{it-1} \times (1 - \delta) + \frac{I_{it}}{P_{it}},$$

(7)

where K_{it} and K_{it-1} are, respectively, the logistics sector's capital stock in region i between t and $t - 1$ periods, K_{i0} is the logistics sector's capital stock in region i during the base period, calculated by dividing the amount of fixed assets investment in 2010 by 10% (at 2010 constant price), δ is the depreciation rate of capital at 9.6 percent [26], and I_{it} and P_{it} denote fixed assets investment and fixed assets investment price index in region i in period t, respectively.

The total number of the logistics sector's urban employees, as well as urban private firms and individuals, is used to calculate the labor force input indicator.

Using the logistics sector's energy consumption as the energy input indicator, converting the various kinds of logistics energy consumption in different provinces into standard coal, and measuring total energy consumption, the following is the formula for processing converted standard coal:

$$E = \sum_{i=1}^{11} (M_i \times P_i),$$

(8)

where E means the total quantity of energy consumption after conversion of all forms of energy consumption to standard coal, M_i represents the various types of energy consumed by the logistics sector, and P_i represents the conversion factor for energy i into standard coal.

4.2. Output Indicators. The GDP deflator is used to reduce the impact of price variations using the logistics industry's value added as a measure of desirable output indicators,

using the base period of 2010. Choosing carbon dioxide emissions of the logistics industry as a measure of undesirable output indicator, carbon dioxide emissions are calculated as the sum of the products of the energy consumption in the logistics industry each year, using the emission factors proposed in 2006 by the United Nations Intergovernmental Panel on Climate Change (IPCC).

4.3. External Environmental Variables. External environmental variables primarily comprise aspects that have a considerable influence on the efficiency of the logistics sector but are beyond the control of the logistics industry itself. In this paper, the elements of the external environment are selected from four categories: economic condition, informatization development, industrial market scale, and import and export.

First, the provincial GDP is selected as a measure of economic condition and processed through the GDP deflator. The improvement of provincial economic conditions has a favorable influence on the development of the logistics sector as well as the efficiency of the logistics industry. Second, the number of mobile phone users at year-end in each province has been chosen as an essential indicator to assess the level of development of information technology. The popularity of smartphones makes information more accessible, and the terminal development of logistics information systems shifts to mobile, driving the growth of the logistics sector and influencing logistics sector efficiency. Third, the industry market scale, the continuous optimization of the industrial market size has led to the fast expansion of the logistics sector, which has had a positive influence on the efficiency of the logistics industry, and the total number of registered legal entities in the logistics business in each province is a key measure for assessing the industry's growth. Fourth, the total import and export in each province is chosen as the import and export measurement, which assists its logistics industry in opening up international markets and promoting the integration of domestic and foreign commodities' markets.

4.4. Data Sources. This paper examines the logistics sector in 12 provinces along the new western land-sea corridor between 2010 and 2019, covering inner Mongolia, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang (Tibet is not included due to missing data on energy consumption). Data from transportation, storage, and postal services are used to replace the statistics of the logistics industry. The collected data is from the websites of the China National Bureau of Statistics, the China Energy Statistics Yearbook, and the China Statistics Yearbook. Table 1 displays the descriptive data for critical factors.

In order to make the measurement result more reasonable, the Pearson's correlation test of input-output indicators is carried out by using Stata 16. The correlation coefficient of input and output indicators is high, all of which passed the 1% significance test and satisfied isotropy requirements; Table 2 displays the results.

5. Empirical Results

5.1. Three-Stage SBM with Undesirable Output

5.1.1. The First Stage. The initial input and output data from the logistics business from 2010 to 2019 were substituted into the input-oriented SBM model utilizing 12 provinces as DMUs, and technical efficiency, pure technical efficiency, and scale efficiency in the logistics sector were derived using the MaxDEA Pro8 software, with the results shown in Tables 3–5.

Overall, the average technical efficiency of the logistics sector increased from 0.657 in 2010 to 0.695 in 2019, while the average pure technical efficiency climbed from 0.785 in 2010 to 0.823 in 2019, and the average scale efficiency increased from 0.834 in 2010 to 0.866 in 2019 across 12 provinces, which has not yet reached the production frontier. It is suggested that although the technical efficiency of the logistics sector has improved in the provinces along the new western land-sea corridor, it is still usually low and its growth is slow. By area, the logistics sector's average technical efficiency is higher in the northern area than in the southern area of the corridor, with the northern area decreasing from 0.792 in 2010 to 0.76 in 2019 and the southern area increasing from 0.522 in 2010 to 0.629 in 2019. By province, the logistics sector efficiency varies substantially among provinces, and the unbalanced growth of the logistics industry is quite prominent. While insisting on the expansion of the logistics sector, some provinces place a premium on environmental preservation and are able to approach the production frontier in terms of technical efficiency, while others have more opportunity for efficiency improvement in general. Ningxia, Inner Mongolia, and Shaanxi are the top three provinces in terms of average technical efficiency, all around 0.9, implying that these provinces are close to the production frontier. Sichuan, Qinghai, and Hainan have the lowest technical efficiency in logistics industry, of which Sichuan is 0.532. The technical efficiency of the logistics sector in Sichuan increased from 0.386 in 2010 to 0.726 in 2017 and decreased to 0.554 in 2019. From 2014 to 2019, pure technical efficiency was at the forefront of production, but scale efficiency continued to decline, leading to a decrease in technical efficiency. The logistics industry's technical efficiency in Qinghai has been on a slow downward trend except for a slight increase in 2015. Although the pure technical efficiency was at the production frontier, scale efficiency fluctuated around 0.5 percent, which led to a decline of technical efficiency. In the Hainan's logistics business, the trend of technical efficiency was more consistent with pure technical efficiency, and the increase of scale efficiency results in the fluctuation of technical efficiency. The logistics sector in Guangxi, Chongqing, Guizhou, Yunnan, Gansu, and Xinjiang was less technologically efficient overall, but the scale efficiency was high and the pure technical efficiency was low, which led to low technical efficiency.

TABLE 1: Descriptive statistics.

Indicator type	Indicator name	Sample	Average	Standard deviation	Minimum	Maximum
Input	Logistics industry total social fixed asset investment (100 million yuan)	120	7893.046	5676.191	1188.355	29314.7
	Logistics industry urban employment (10,000 people)	120	342.8625	259.7919	46.5	1175.5
	Logistics industry energy consumption (10,000 tons of standard coal)	120	728.7934	391.618	110.7651	1715.842
Desirable output	Logistics industry value added (100 million yuan)	120	533.1633	330.8203	70.7	1473.1
Undesirable output	Carbon dioxide emissions from logistics industry (10,000 tons)	120	1793.214	958.1894	285.3466	4083.725
External environmental variables	Economic condition (100 million yuan)	120	10829.42	8099.973	1144.2	43169.27
	Informatization development (10,000 households)	120	2670.013	1800.94	290.3	9443.5
	Industrial market scale (units)	120	5623.533	4161.654	471	19283
	Import and export (US $100 million)	120	241.013	235.7846	5.44815	984.0066

Table 2: Pearson's correlation coefficient of logistics industry input-output indicators.

Input-output indicators	Total social fixed asset investment	Urban employment	Energy consumption
Value added	0.8728***	0.8149***	0.8738***
Carbon dioxide emissions	0.8701***	0.7124***	0.9983***

Note. ***indicates significance at 1% level.

Table 3: Logistics industry's technical efficiency in the first stage of the new western land-sea corridor.

Province	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
Inner Mongolia	0.744	1.000	1.000	0.681	0.747	0.959	1.000	1.000	1.000	1.000	0.913
Guangxi	0.571	0.627	0.586	0.630	0.660	0.772	0.733	0.725	0.653	0.602	0.656
Hainan	0.443	0.458	0.456	0.450	0.532	0.652	0.717	0.716	0.662	0.722	0.581
Chongqing	0.766	0.769	0.629	0.601	0.677	0.698	0.728	0.680	0.665	0.635	0.685
Sichuan	0.386	0.411	0.378	0.472	0.554	0.573	0.574	0.726	0.690	0.554	0.532
Guizhou	0.606	0.736	0.607	0.578	0.677	0.829	1.000	1.000	0.728	0.640	0.740
Yunnan	0.356	0.380	0.409	0.449	0.518	1.000	0.868	0.829	0.721	0.621	0.615
Shaanxi	1.000	0.757	0.732	0.706	0.821	1.000	1.000	0.984	0.813	0.741	0.855
Gansu	1.000	1.000	0.878	0.750	0.734	0.765	0.742	0.732	0.701	0.661	0.796
Qinghai	0.569	0.599	0.563	0.528	0.599	0.643	0.576	0.528	0.437	0.394	0.544
Ningxia	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.845	0.766	0.961
Xinjiang	0.439	0.453	0.504	0.484	0.618	0.668	0.695	0.589	1.000	1.000	0.645
Average	0.657	0.682	0.645	0.611	0.678	0.797	0.803	0.793	0.743	0.695	0.710
Southern area average	0.522	0.563	0.511	0.530	0.603	0.754	0.770	0.779	0.687	0.629	0.635
Northern area average	0.792	0.801	0.780	0.691	0.753	0.839	0.835	0.806	0.799	0.760	0.786

Table 4: Logistics industry's pure technical efficiency in the first stage of the new western land-sea corridor.

Province	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
Inner Mongolia	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Guangxi	0.717	0.811	0.773	0.863	0.789	0.824	0.737	0.736	0.660	0.613	0.752
Hainan	0.619	0.631	0.639	0.609	0.651	0.673	0.740	0.826	0.744	0.857	0.699
Chongqing	1.000	1.000	1.000	1.000	0.821	0.764	0.729	0.687	0.670	0.642	0.831
Sichuan	0.500	0.530	0.507	0.629	1.000	1.000	1.000	1.000	1.000	1.000	0.817
Guizhou	0.674	0.774	0.706	0.754	1.000	0.845	1.000	1.000	0.746	0.668	0.817
Yunnan	0.432	0.447	0.524	0.613	0.620	1.000	0.869	0.835	0.723	0.624	0.669
Shaanxi	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.815	0.744	0.956
Gansu	1.000	1.000	1.000	1.000	1.000	0.814	0.754	0.785	0.740	0.723	0.882
Qinghai	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.721	1.000	0.972
Ningxia	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Xinjiang	0.479	0.468	0.566	0.614	0.725	0.722	0.699	0.606	1.000	1.000	0.688
Average	0.785	0.805	0.810	0.840	0.884	0.887	0.877	0.873	0.818	0.823	0.840
Southern area average	0.657	0.699	0.691	0.745	0.813	0.851	0.846	0.847	0.757	0.734	0.764
Northern area average	0.913	0.911	0.928	0.936	0.954	0.923	0.909	0.899	0.879	0.911	0.916

5.1.2. The Second Stage. In the Stochastic frontier analysis (SFA), explanatory variables are the input slack variables obtained in the first phase, economic development, informatization development, industry market scale, and import and export are the independent variables, while the frontier 4.1 software can be used to study the impact of external environmental factors on the input slack variables, as detailed in Table 6.

Table 6 demonstrates that the one-sided likelihood ratio tests are 34.03, 31.77, and 57.28, respectively, all of which are significantly tested at a level of 1%. It suggests that external environmental variables should be excluded when studying the technical efficiency of the logistics sector along the new western land-sea corridor, and the estimation

result of the SFA model is acceptable. All three gamma values passed the significance test of 1%, which shows that the selected external environmental variables are more plausible. When the external environmental variables are positively correlated with the input slack variables, it means that increasing the external environmental variables will increase input redundancy and decrease technical efficiency. When the external environmental variables are negatively correlated with the input slack variables, reducing the external environmental variables helps to minimize input redundancy and increase the logistics sector's technical efficiency. With the provincial gross domestic product (GDP), the number of mobile phone users at year-end, the number of registered legal entities in

TABLE 5: Logistics industry's scale efficiency in the first stage of the new western land-sea corridor.

Province	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
Inner Mongolia	0.744 Drs	1.000 —	1.000 —	0.681 Drs	0.747 Drs	0.959 Drs	1.000 —	1.000 —	1.000 —	1.000 —	0.913
Guangxi	0.797 Drs	0.773 Drs	0.759 Drs	0.731 Drs	0.837 Drs	0.937 Drs	0.995 Irs	0.985 Irs	0.990 Irs	0.982 Irs	0.879
Hainan	0.716 Irs	0.726 Irs	0.714 Irs	0.739 Irs	0.817 Irs	0.968 Irs	0.969 Irs	0.867 Irs	0.890 Irs	0.842 Irs	0.825
Chongqing	0.766 Drs	0.769 Drs	0.629 Drs	0.601 Drs	0.825 Drs	0.914 Drs	0.999 Irs	0.989 Irs	0.992 Irs	0.990 Irs	0.847
Sichuan	0.773 Drs	0.775 Drs	0.745 Drs	0.750 Drs	0.554 Drs	0.573 Drs	0.574 Drs	0.726 Drs	0.690 Drs	0.554 Drs	0.671
Guizhou	0.899 Drs	0.951 Drs	0.859 Drs	0.768 Drs	0.677 Drs	0.981 Drs	1.000 —	1.000 —	0.975 Irs	0.958 Irs	0.907
Yunnan	0.824 Drs	0.851 Drs	0.781 Drs	0.732 Drs	0.836 Drs	1.000 —	0.999 Irs	0.993 Irs	0.997 Irs	0.994 Irs	0.901
Shaanxi	1.000 —	0.757 Drs	0.732 Drs	0.706 Drs	0.821 Drs	1.000 —	1.000 —	0.984 Drs	0.997 Irs	0.996 Irs	0.899
Gansu	1.000 —	1.000 —	0.878 Drs	0.750 Drs	0.734 Drs	0.941 Drs	0.983 Irs	0.932 Irs	0.947 Irs	0.914 Irs	0.908
Qinghai	0.569 Irs	0.599 Irs	0.563 Irs	0.528 Irs	0.599 Irs	0.643 Irs	0.576 Irs	0.528 Irs	0.606 Irs	0.394 Irs	0.560
Ningxia	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	0.845 Irs	0.766 Irs	0.961
Xinjiang	0.916 Drs	0.968 Drs	0.890 Drs	0.788 Drs	0.852 Drs	0.926 Drs	0.995 Irs	0.972 Irs	1.000 —	1.000 —	0.931
Average	0.834	0.847	0.796	0.731	0.775	0.903	0.924	0.915	0.911	0.866	0.850
Southern area average	0.796	0.808	0.748	0.720	0.758	0.895	0.923	0.927	0.922	0.887	0.838
Northern area average	0.871	0.887	0.844	0.742	0.792	0.911	0.926	0.903	0.899	0.845	0.862

Note. irs, drs, and "—" represent increasing, decreasing, and constant returns to scale, respectively.

the logistics business, and the provincial total imports and exports employed as explanatory variables, most of the variables passed the 1% level significance test.

(1) Economic Condition. The provincial gross domestic product (GDP) is a measure of economic growth, which is negatively related to three slack elements. It implies that the improvement of economic conditions can reduce the input redundancy of capital stock and employees' energy consumption, reasonably allocate the resources of the logistics industry, and improve technical efficiency in the logistics industry.

(2) Informatization Development. The informatization level represented by the number of mobile phone users at year-end shows a substantial positive connection with the slack variables of capital stock and energy consumption and a significant negative correlation with the slack variables of employees, all of which pass the 1 percentage point significance test. This suggests that the increase in mobile phone users at year-end will boost the redundancy of capital stock and energy consumption inputs, which will lead to inefficiencies in capital inputs and energy consumption, while reducing the redundancy of employee inputs to make them more rational.

(3) Industry Market Scale. The industry market scale represented by the number of registered legal entities throughout the logistics business has a high positive association with energy consumption slack variables, a negative correlation with capital slack variables, and no significant relationship with employee slack variables. This shows that as the number of registered legal persons increases, so will the number of firms, resulting in lower energy efficiency and more rational capital allocation.

(4) Import and Export. The provincial total imports and exports are significantly positively correlated with slack variables of employee and energy consumption, but negligible with capital stock. It implies that an increase in import and export will generate redundancy in the number of employees and energy consumption, causing irrational input of employees and inefficient use of energy in the logistics industry.

5.1.3. The Third Stage. The SBM model was applied to calculate the adjusted input variables instead of observed input variables to obtain accurate technical efficiency, pure technical efficiency, and scale efficiency in the logistics industry, removing the impacts of environmental factors and statistical noise, as illustrated in Tables 7–9.

TABLE 6: Second stage for SFA regression results.

Variable	Capital stock slack variable		Employee slack variable		Energy consumption slack variable	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Constant term	−550.08	−1.58	12.75	0.90	8.63	0.50
Economic condition	−12170.524***	−15.18	−421.26*	−1.74	−2824.50***	−6.70
Informatization development	78220.576***	177.01	−599.99***	−2.74	2161.98***	5.13
Industry market scale	−1778.34***	−4.29	−415.43	−0.71	3468.94***	4.95
Import and export	296.32	0.34	415.7825***	6.41	231.79***	3.01
Sigma-squared	6601762.70***	2627652.00	13050.99***	66.78	36212.30***	6556.07
Gamma	0.53***	7.65	0.58***	10.71	0.73***	20.83
Log likelihood function	−1076.76		−717.98		−740.05	
One-sided likelihood ratio test	34.03***		31.77***		57.28***	

Note.*, **, and *** are significant at 10%, 5%, and 1%, respectively.

TABLE 7: Logistics industry's technical efficiency in the third stage of the new western land-sea corridor.

Province	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
Inner Mongolia	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Guangxi	0.906	0.920	0.920	1.000	0.915	0.940	0.885	0.875	0.855	0.823	0.904
Hainan	0.367	0.361	0.378	0.377	0.400	0.480	0.453	0.412	0.391	0.386	0.401
Chongqing	1.000	1.000	1.000	0.901	1.000	0.942	0.862	0.828	0.827	0.812	0.917
Sichuan	0.789	0.783	0.795	0.863	0.783	0.698	0.672	1.000	0.823	0.716	0.792
Guizhou	0.700	0.720	0.742	0.724	0.675	0.741	0.649	0.672	0.724	0.692	0.704
Yunnan	0.679	0.694	0.757	0.778	0.814	0.835	0.818	0.864	0.879	0.831	0.795
Shaanxi	1.000	0.964	1.000	1.000	1.000	1.000	1.000	0.914	0.934	0.883	0.969
Gansu	0.788	0.798	1.000	0.701	0.666	0.700	0.630	0.599	0.579	0.550	0.701
Qinghai	0.293	0.279	0.282	0.276	0.270	0.281	0.256	0.237	0.227	0.184	0.259
Ningxia	1.000	1.000	1.000	1.000	1.000	0.513	0.463	0.373	0.325	0.293	0.697
Xinjiang	0.584	0.581	0.679	0.631	0.725	0.729	0.680	0.639	0.728	0.677	0.665
Average	0.759	0.758	0.796	0.771	0.771	0.738	0.697	0.701	0.691	0.654	0.734
Southern area average	0.777	0.777	0.799	0.806	0.798	0.805	0.763	0.795	0.776	0.735	0.783
Northern area average	0.778	0.770	0.827	0.768	0.777	0.704	0.672	0.627	0.632	0.598	0.715

TABLE 8: Logistics industry's pure technical efficiency in the third stage of the new western land-sea corridor.

Province	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
Inner Mongolia	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Guangxi	0.956	0.960	1.000	1.000	1.000	1.000	0.971	0.978	0.953	0.940	0.976
Hainan	0.946	1.000	1.000	0.965	0.975	0.970	0.974	0.985	0.976	1.000	0.979
Chongqing	1.000	1.000	1.000	1.000	1.000	0.971	0.926	0.913	0.906	0.891	0.961
Sichuan	0.791	0.799	0.826	0.894	1.000	1.000	1.000	1.000	1.000	1.000	0.931
Guizhou	0.939	0.948	0.936	0.948	1.000	0.960	1.000	1.000	0.924	0.900	0.955
Yunnan	0.788	0.794	0.856	0.896	0.881	1.000	1.000	1.000	0.908	0.864	0.899
Shaanxi	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.952	0.969	0.916	0.984
Gansu	1.000	1.000	1.000	1.000	1.000	1.000	0.959	1.000	0.970	0.956	0.989
Qinghai	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.968	1.000	0.997
Ningxia	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Xinjiang	0.889	0.898	0.922	0.913	0.935	0.907	0.899	0.846	1.000	1.000	0.921
Average	0.942	0.950	0.962	0.968	0.983	0.984	0.977	0.973	0.965	0.956	0.966
Southern area average	0.903	0.917	0.936	0.950	0.976	0.984	0.979	0.979	0.945	0.933	0.950
Northern area average	0.981	0.983	0.987	0.985	0.989	0.985	0.976	0.966	0.985	0.979	0.982

Overall, the average technical efficiency in the logistics sector increased from 0.710 in the first phase to 0.734 in the third phase in 12 provinces along the new western land-sea corridor, indicating that, despite a lower average technical efficiency, uncertainties such as external environment variables continue to underestimate the logistics industry's technical efficiency. The average technical efficiency of the logistics sector in the southern area increased from 0.635 in the first phase to 0.783 in the third phase, and the logistics sector's average technical efficiency in the northern area decreased from 0.786 in the first phase to 0.715 in the third phase, indicating the adjusted average technical efficiency in the southern area is higher.

TABLE 9: Logistics industry's scale efficiency in the third stage of the new western land-sea corridor.

Province	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
Inner Mongolia	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	1.000
Guangxi	0.948 Irs	0.959 Irs	0.920 Irs	1.000 —	0.915 Irs	0.940 Irs	0.911 Irs	0.894 Irs	0.897 Irs	0.875 Irs	0.926
Hainan	0.388 Irs	0.361 Irs	0.378 Irs	0.391 Irs	0.410 Irs	0.495 Irs	0.465 Irs	0.419 Irs	0.401 Irs	0.386 Irs	0.409
Chongqing	1.000 —	1.000 —	1.000 —	0.901 Irs	1.000 —	0.970 Irs	0.930 Irs	0.907 Irs	0.913 Irs	0.912 Irs	0.953
Sichuan	0.996 Irs	0.980 Irs	0.962 Irs	0.966 Irs	0.783 Drs	0.698 Drs	0.672 Drs	1.000 —	0.823 Drs	0.716 Drs	0.860
Guizhou	0.746 Irs	0.759 Irs	0.793 Irs	0.764 Irs	0.675 Irs	0.772 Irs	0.649 Irs	0.672 Irs	0.784 Irs	0.769 Irs	0.738
Yunnan	0.862 Irs	0.873 Irs	0.884 Irs	0.869 Irs	0.924 Irs	0.835 Irs	0.818 Irs	0.864 Irs	0.968 Irs	0.961 Irs	0.886
Shaanxi	1.000 —	0.964 Irs	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	0.959 Irs	0.964 Irs	0.964 Irs	0.985
Gansu	0.788 Irs	0.798 Irs	1.000 —	0.701 Irs	0.666 Irs	0.700 Irs	0.657 Irs	0.599 Irs	0.597 Irs	0.575 Irs	0.708
Qinghai	0.293 Irs	0.279 Irs	0.282 Irs	0.276 Irs	0.270 Irs	0.281 Irs	0.256 Irs	0.237 Irs	0.235 Irs	0.184 Irs	0.259
Ningxia	1.000 —	1.000 —	1.000 —	1.000 —	1.000 —	0.513 Irs	0.463 Irs	0.373 Irs	0.325 Irs	0.293 Irs	0.697
Xinjiang	0.657 Irs	0.646 Irs	0.736 Irs	0.692 Irs	0.776 Irs	0.804 Irs	0.757 Irs	0.755 Irs	0.728 Irs	0.677 Irs	0.723
Average	0.807	0.802	0.830	0.797	0.785	0.751	0.715	0.723	0.720	0.693	0.762
Southern area average	0.823	0.822	0.823	0.815	0.785	0.785	0.741	0.793	0.798	0.770	0.795
Northern area average	0.790	0.781	0.836	0.778	0.785	0.716	0.689	0.654	0.641	0.616	0.729

Note. irs, drs, and "—" represent increasing, decreasing and constant returns to scale, respectively.

Technical efficiency in the logistics sector varies widely among provinces, both before and after adjustments. The average technical efficiency of Guangxi's logistics industry rose from 0.656 in the first step to 0.904 in the third step, and that of Chongqing's logistics industry rose from 0.685 in the first step to 0.917 in the third step, both of which showed that external environment variables had a great influence. Among them, improving the pure technical efficiency seems to be the key factor for improving the logistics sector's technical efficiency in Guangxi and Chongqing, and increasing the logistics sector's scale efficiency can only affect the technical efficiency in Chongqing. Inner Mongolia and Shaanxi have much higher efficiency levels in the logistics industry than other provinces. Inner Mongolia's adjusted technical efficiency reached the production frontier, and Shaanxi's adjusted technical efficiency was 0.969, mainly because Inner Mongolia and Shaanxi are close to central China, with relatively good transportation infrastructure conditions, relatively large labor and capital investment. The logistic industry's technical efficiency in Qinghai and Ningxia declined from 0.544 to 0.961 in the first step to 0.259 and 0.697 in the third step, respectively. The two provinces' pure technical efficiency is at the production frontier. The decline in technical efficiency is mainly due to a fall in scale efficiency, demonstrating that the high efficiency of the first

step is influenced by changes in the external environment. Although pure technical efficiency has improved in Hainan, Guizhou, Gansu, and Xinjiang, scale efficiency has decreased, resulting in a slight decrease in the logistics industry's technical efficiency, indicating that external environmental variables have not significantly driven the logistics industry's development.

5.1.4. Malmquist–Luenberger Productivity Index. This paper uses MaxDEA Pro8 to substitute the adjusted input and initial output variables into the Malmquist–Luenberger productivity index to calculate the changes of total factor productivity in 12 provinces along the new western land-sea corridor from 2010 to 2019, and the calculation results are shown in Tables 10 and 11.

The Malmquist–Luenberger productivity index remained higher than 1 except in 2015–2016, 2016–2017, and 2018–2019. Over the last decade, the Malmquist–Luenberger productivity index for logistics businesses along the new western land-sea corridor has averaged 1.048, which indicates that the total factor productivity is increasing and that the logistics industry is developing quicker. On average, the technical change index increased by 6.6 percent, but the efficiency change index decreased by 1.5 percent. Because the efficiency change index has declined at a slower rate than

TABLE 10: Malmquist–Luenberger productivity index of logistics industry in the new western land-sea corridor.

Year	Efficiency change index	Technical change index	Pure technical efficiency change index	Scale efficiency change index	Malmquist–Luenberger productivity index
2010-2011	0.997	1.178	1.008	0.989	1.175
2011-2012	1.054	0.958	1.014	1.040	1.007
2012-2013	0.974	1.104	1.008	0.966	1.074
2013-2014	1.004	1.077	1.016	0.990	1.083
2014-2015	0.983	1.199	1.003	0.982	1.157
2015-2016	0.939	1.046	0.993	0.945	0.981
2016-2017	0.998	0.995	0.995	1.003	0.994
2017-2018	0.983	1.040	0.994	0.992	1.022
2018-2019	0.937	0.999	0.990	0.947	0.936
Average	0.985	1.066	1.002	0.984	1.048

TABLE 11: Malmquist–Luenberger productivity index of logistics industry in 12 provinces in the new western land-sea corridor.

Provinces	Efficiency change index	Technical change index	Pure technical efficiency change index	Scale efficiency change index	Malmquist–luenberger productivity index
Inner Mongolia	1.000	1.029	1.000	1.000	1.029
Guangxi	0.991	1.050	0.998	0.992	1.041
Hainan	1.009	1.039	1.006	1.003	1.049
Chongqing	0.979	1.076	0.987	0.991	1.054
Sichuan	1.004	1.063	1.027	0.979	1.065
Guizhou	1.001	1.039	0.996	1.009	1.040
Yunnan	1.023	1.047	1.012	1.014	1.073
Shaanxi	0.987	1.121	0.991	0.996	1.108
Gansu	0.970	1.089	0.995	0.975	1.046
Qinghai	0.952	1.038	1.000	0.952	0.989
Ningxia	0.888	1.149	1.000	0.888	1.001
Xinjiang	1.021	1.055	1.015	1.006	1.079
Average	1.001	1.052	1.005	0.998	1.054
Southern area average	0.970	1.080	1.000	0.970	1.042
Northern area average	0.984	1.070	1.003	0.982	1.049

the technical change index, the average annual growth of TFP has remained at 4.8 percent over the past decade, suggesting that technological progress is a key factor in increasing TFP. The scale efficiency change contributed −1.6 percent to total factor productivity index change, indicating that change in the scale efficiency has a detrimental impact on total factor productivity improvement. The efficiency change index was less than 1 in 7 out of 10 years, and the lowest being 0.937 in 2018–2019, indicating a downward trend. However, the technical change index was greater than 1 in 7 out of 10 years, and the highest value was 1.199 in 2014–2015, indicating an upward trend. Furthermore, the Malmquist–Luenberger index and the technical change index kept the same overall trends, with an apparent upward trend only in 2014–2015.

Only Qinghai had a Malmquist–Luenberger productivity index less than 1 among the 12 provinces, while the rest provinces had a Malmquist–Luenberger productivity index more than 1. The average Malmquist–Luenberger productivity index was 1.049, indicating an overall increase in the total factor productivity, with 92 percent of provinces contributing to an increase in the logistics industry's total factor productivity. Technical change indexes of all provinces were greater than 1, with an average of 1.070,

indicating an overall upward trend in the total factor productivity in the logistics sector. The pure technical efficiency change index was less than 1 in 5 provinces and greater than 1 in 7 provinces. The overall mean of the pure technical efficiency change index was 1.003, indicating an upward trend in 58.3 percent of the provinces in the logistics sector. The average Malmquist–Luenberger index, as well as the average index of technical change in the southern and northern areas, were both more than 1, whereas the average index of scale efficiency change was less than 1. The acceleration of technological advancement is the reason for the growth of total factor productivity in the logistics sector in the 12 provinces of the new western land-sea corridor, and the primary decrease is the fall in scale efficiency.

6. Conclusions and Policy Proposals

This article considers the relationship between logistics sector expansion and environmental protection in a systematic manner, using panel data from the logistics industry along China's new western land-sea corridor between 2010 and 2019, and measures actual logistics industry efficiency after excluding the impact of external environmental variables as well as statistical noise by employing nonradial,

nonoriented three-stage SBM with undesirable output. Finally, the Malmquist–Luenberger productivity index is used to study the dynamic evolution of logistics business efficiency, and the following conclusions are drawn:

(1) External environmental variables have a great influence on the efficiency of the logistics sector. Economic conditions, informatization development, industrial market scale, and import and export all have an influence on the logistics sector's efficiency. The efficiency of the logistics business varies between the first and third phases, and the effect of each external environment variable on the logistics sector efficiency is different.

(2) In general, the overall logistics sector efficiency in the new western land-sea corridor remains low, despite ongoing improvement. The logistics industry's resource allocation is insufficiently optimized, and the development rate is rather modest. The pure technical efficiency is relatively high, and it is the key factor influencing the expansion of the technical efficiency, while the scale of the logistics sector does not correspond to the current level of industrial development.

(3) The technical efficiency in the logistics sector in the southern and northern areas of the new western land-sea corridor both have development potential. On average, the logistics industry's technical efficiency in the southern area is greater than that in the northern area, while it is substantially higher in the provinces near central China than in the remote hinterland areas.

(4) The efficiency of the logistics business varies greatly by province. Except for Inner Mongolia, where the adjusted efficiency of the logistics sector is on the production frontier, the technical efficiency of other provinces has changed significantly in the past 10 years. Shaanxi and Chongqing continue to have the highest adjusted technical efficiency, while Qinghai, Xinjiang, and Hainan have the lowest.

(5) Over the 10 year period, the total factor productivity of the logistics industry along the new western land-sea corridor has improved by approximately 4.8 percent each year, while the technological change index increased by an average of 6.6 percent every year, indicating an overall improvement. The primary cause of the improvement is technical development, whereas the primary cause of the drop is the decrease in scale efficiency. The total factor productivity of the logistics industry in 92% of the provinces in the new western land-sea corridor has improved.

This research makes the following recommendations relying on the measurement results:

Firstly, it is essential to continually improve the external environment in order to help the expansion of the logistics firms. Given the variety of external environmental variables in each province along the new western land-sea corridor, environmental adjustments have resulted in significant variances in logistics sector efficiency in various provinces. Each province should pool its resources and develop regulations to increase logistics business efficiency, as well as encourage logistics enterprises to grow larger and stronger through government investment, form a market operation mode guided by the government but dominated by enterprises, and accelerate resource gathering.

Secondly, it is necessary to enhance both pure technical efficiency and scale efficiency. The technical efficiency is mostly governed by the pure technical efficiency of the logistics sector in each province, and the average scale efficiency of most provinces is declining. Each province should take full advantage of the opportunity of "new infrastructure" construction, upgrade and promote logistics information technology and the connection between railway freight transport and port hubs, promote the construction of a perfect multimodal transport system and enhance air-rail and other modes of transportation, integrate cargo capacity with Internet platforms, and promote cross-regional cooperation in the logistics industry.

Thirdly, it is crucial to enhance the current operating efficiency of the new western land-sea corridor to launch the new western land-sea corridor's close connection with the Yangtze River Economic Belt, ensure smooth southbound rail-sea and international railway intermodal transport, strengthen synergistic and joint development inside and outside the corridor, and encourage low costs and service enhancement in the logistics sector.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest regarding this work.

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Research Article

Government-Enterprise Collusion and the Effectiveness of Environmental Regulations: Implications for Public Health

Shuang Zhao [ID],[1] Lin Peng,[2] Haiyan Zhou,[3] and Feng Hu [ID][4]

[1]*Business School, Hohai University, Nanjing 211106, China*
[2]*School of Economics and Management, Chuzhou University, Chuzhou 239000, China*
[3]*Institute of Digital Economy and Green Development, Chifeng University, Chifeng 024000, China*
[4]*Global Value Chain Research Center, Zhejiang Gongshang University, Hangzhou 310018, China*

Correspondence should be addressed to Feng Hu; hufeng@mail.zjgsu.edu.cn

Effective environmental management will create a win-win situation for building an ecological civilization with the potential to control the COVID-19 pandemic. From the perspective of government-enterprise collusion (GEC), this study analyzes the moderating effects of the officials' promotion incentives and turnover on the effectiveness of environmental regulations utilizing a panel dataset on 276 cities in China from 2003 to 2019. The study reveals the following empirical results: First, promotion incentives positively moderate the relationship between environmental regulations and environmental pollution, mainly air pollution; results for water pollution are not significant. Compared with general cities, the positive moderating effect of promotion incentives in high-level cities is weaker and the negative moderating effect is more potent. Additionally, the moderating effect of promotion incentives is predominantly positive in the new developmental stage from 2013 to 2019. Second, the negative moderating effect of officials' turnover on the effectiveness of environmental regulations is mainly observed for water pollution but not evident for air pollution. Compared with high-level cities, officials' turnover in general cities is more conducive to the effectiveness of environmental regulations. These findings provide beneficial insights for promoting green growth by improving official governance and destroying GEC.

1. Introduction

COVID-19 poses a severe threat to public health around the world. Governments have taken measures such as travel restrictions and city blockades to deal with the spread of the pandemic. In addition to spatial strategies such as isolation and interdiction, some studies have found that environmental pollution, especially air pollution, significantly impacts the spread of COVID-19 [1–3]. Air pollutants (such as $PM_{2.5}$, PM_{10}, NO_2, and SO_2) act as carriers to spread the COVID-19 virus and also affect lung health, making those infected more vulnerable to the virus. Therefore, strengthening pollution governance will contribute to alleviating environmental degradation and controlling the COVID-19 pandemic. China has made tremendous economic achievements since it began to open up and reform its

economy. However, the ensuing extensive development also brought severe environmental pollution. According to China's 2020 Eco-Environment Bulletin, 43.3% of China's cities (337) exceeded the standard of ambient air quality and 43.6% of the 10,242 groundwater quality monitoring points registered Class V water. Governments at all levels have strengthened the enforcement of environmental regulations; nevertheless, the actual results are not promising [4, 5]. The report "Confessions of the Director of the Environmental Protection Bureau: I am the Director of Public Relations Showmanship" sparked public thinking. According to the report, although the concept of green development continues to gain popularity, some regions still maintain the former development model, in spite of high pollution and high emissions, under the wraps of promotional tournaments and dependence on traditional development models.

Enterprises contribute to tax revenue, while local governments provide shelter for nonclean production. Environmental damage is still tacitly permitted and tolerated, thus creating high growth and heavy pollution concurrently. Western mainstream economic theories cannot effectively explain China's development model of growth and pollution at high levels simultaneously. Some studies advance the theory of government-enterprise collusion (GEC) to integrate growth and pollution into the same analytical framework [6, 7].

The asymmetrical information between the central and local governments provides favorable conditions for collusion, and the officials' promotion incentives to pursue short-term economic growth are undoubtedly an essential driving factor for GEC [7, 8]. Local officials are desperate to demonstrate their performance and competence during their short-term service under the tenure system, which requires mandatory retirement at a fixed age; conversely, the high turnover rate of local officials affects the stability of the collusion network. Evidence shows that local officials frequently change, and their terms are generally short in China. Between 2007 and 2017, nearly 80% of municipal party secretaries were reassigned in less than five years and more than 20% were in office for less than a year [9]. Frequent turnover of principal local officials undermines the collusion network and creates a deterrent-sensitive period. What are the effects of promotion incentives and officials' turnover rates on environmental regulations in the context of collusion enhancement and deterrence perspectives? Are these effects heterogeneous according to pollutant and city class? The answers to these questions are important to achieve a win-win situation for constructing an ecological civilization and controlling the COVID-19 pandemic.

The marginal contribution of this study is threefold. First, the study probes the moderating effects of promotion incentives and officials' turnover on the relationship between environmental regulations and environmental pollution. To the best of our knowledge, previous research studies focused on the direct effects of promotion incentives and officials' turnover on the environmental system, and few studies examined the moderating effects of both. Our analysis incorporates promotion incentives and officials' turnover into the effectiveness of environmental regulations from the perspective of GEC and reveals the moderating effects of promotion incentives and officials' turnover. Second, the study introduces GEC into the research of environmental regulatory effectiveness, which will expand the application scenario of the theory of GEC and the research perspective of environmental regulatory effectiveness. Previous studies introduced GEC to issues such as high housing prices, food safety, and overcapacity, but few combined GEC and environmental regulatory effectiveness. Based on this research gap, the mechanisms for collusive reinforcement and breaks caused by promotion incentives and officials' turnover are discussed and their moderating effects on the effectiveness of environmental regulations are examined. Finally, our research focuses on pollutant heterogeneity. Unlike the existing literature that focused on a single pollutant or pollution composite index, our study includes multiple pollutants to investigate the performance of strategic emission reduction due to pollutant heterogeneity.

The rest of the study is organized as follows: Section 2 is the literature review. Section 3 presents the theoretical logic and research hypotheses. Section 4 includes the introduction to model construction and variable data description, and Section 5 shows the empirical results and analyses. The final section contains the conclusions, policy implications, and limitations of the study.

2. Literature Review

Scholars have conducted some research studies on the effectiveness of environmental regulations, which can be divided into two categories according to internal and external research perspectives. The first category concerns the impact of the heterogeneity of environmental regulations on technological innovation and environmental improvement. Environmental regulations can be divided into market-incentive environmental regulations (MERs) and command-controlled environmental regulations (CERs). The former occurs mainly through the environmental protection tax system and emission trading to incentivize each subject to reduce emissions; the latter sets emissions standards and even mandatory shutdowns. The effectiveness of regulations is also quite different due to mechanism and application conditions. Sun et al. [10] found that the incentive effect of MER on innovation in Chinese high-tech enterprises was more significant and that flexible regulatory tools and implementation methods were more conducive to encouraging enterprises to carry out innovative activities. Similarly, Fang and Shao [11] stated that MER promoted regional green technology innovation, while CER inhibited it based on local data in China. However, MER is not always optimal but depends on the heterogeneity of regulated objects. For example, Zhu et al. [12] argued that CER and voluntary regulations positively impacted the green transformation of Chinese steel companies, while MER did not. The second category of studies focuses on the external conditions of environmental policy implementation. Huang and Lei [13] found that the marketization level positively modified the relationship between environmental regulations and enterprises' green investment, which was more significant among nonstate-listed enterprises. Other studies analyzed the fiscal decentralization level, industry differences, and industrial agglomeration [14–16].

Local government officials are an important external factor influencing the effectiveness of environmental regulations in China [17]. Seeking political promotion can be considered the most critical career incentive for Chinese officials [18, 19]. In the context of absolute power held by local governments, the promotion incentives and position turnover of government leaders significantly impact regional economic, social, and environmental systems. Scholars have also conducted research studies on the impact of promotion incentives and officials' turnover on environmental pollution [20–22]. On the whole, there is a consensus that competing for promotions with a one-sided emphasis on economic growth exacerbates environmental pollution.

Furthermore, relevant research studies have explored the mechanisms behind the impact of promotion incentives and officials' turnover on environmental pollution, including the perspectives of GEC and anticipatory effects. Yu et al. [23] stated that under China's current official evaluation system, local governments collude with enterprises to achieve economic growth, which may lead to more severe environmental pollution. Song et al. [24] analyzed the effects of the frequency and predictability of officials leaving office in Chinese cities on air quality in their jurisdictions and found that air pollution spiked in the year prior to the leadership turnover when the incumbent anticipated a change of term. Local leaders are keener on short-term policies to stimulate economic activities. They demonstrate their competence to superiors at the expense of air quality when officials' turnover is frequent and predictable. From the perspective of GEC, promotion incentives and officials' turnover can be organically linked, which provides a valuable reference and inspiration for our research.

The existing literature has explored the impact of promotion incentives and officials' turnover on environmental pollution, but there is still room for discussion about the impact of both on environmental systems. Previous research studies focused on the direct effects of promotion incentives and officials' turnover on environmental pollution; however, the moderating effects are not sufficiently explored, and research from the perspective of GEC is even scarcer. Environmental regulations are currently the primary means for governments to strengthen environmental governance. Systematically, exploring the effects of promotion incentives and officials' turnover on the effectiveness of environmental regulations will facilitate the improvement of environmental governance. Meanwhile, it can also provide a reference for clarifying the mechanisms related to official governance and green development. Our study constructs a theoretical logic that promotion incentives and officials' turnover affect the efficiency of environmental regulations from the perspective of GEC and investigates the moderating effects involved. The main work of this study includes the following points: First, based on the perspective of GEC, we analyze the reinforcing and deterring effects of promotion incentives and officials' turnover on GEC to establish the moderating mechanisms of promotion incentives and officials' turnover on the efficacy of environmental regulations. Second, we examine the impact of environmental regulations on environmental improvement by employing city panel data and using it as a benchmark to explore the moderating effects, focusing on the strategic manifestation of collusion arising from pollutant and city-rank heterogeneity. Ultimately, from the empirical research, we draw policy implications to curb GEC and improve the efficiency of environmental governance.

3. Theoretical Logic and Research Hypothesis

3.1. GEC to Distort Environmental Regulations. The distortion of environmental regulations caused by GEC can be divided into explicit and implicit manifestations. On the one hand, pollution control and green technology research require large amounts of capital investments, which will increase operating costs, reduce corporate profits, and affect the performance of local economic development. To achieve prosperous economic performance in the short term and especially to boost the economy after the COVID-19 pandemic, local governments lower environmental enforcement standards, relax environmental supervision efforts, and even shelter polluting enterprises during inspections by higher level governments. This explicit distortion of environmental regulations by GEC is easy to observe. On the other hand, local governments introduce and develop heavy-polluting industries by lowering environmental requirements, further exacerbating local environmental pressures. The explicit and implicit distortions of environmental regulations by GEC are intertwined, with local officials and enterprises deriving economic performance and operating profits from collusion and regulatory distortions, respectively. Enterprises lose the motivation and incentive to control pollution gradually, and the effectiveness of environmental regulations diminishes significantly.

3.2. Promotion Incentives to Establish GEC. The widespread principal-agent relationships between central and local governments inevitably lead to information asymmetry. The degree of information asymmetry is likely to deepen, especially in the context of economic decentralization, which has become one of the critical challenges in the modernization of national governance. Although the central government collects local information through various means, such as the establishment of six regional inspection centers for environmental protection in 2006 to alleviate the information asymmetry dilemma, the effect is still limited compared to the massive amount of information in economic and social systems. GEC is easy to establish in a situation where the central or higher level government does not have complete access to local information.

Asymmetric information prevents the central government from comprehensively understanding all local government behaviors. To avoid moral hazards, the central government has developed different assessment systems for local officials in various stages of development. The bias of assessment systems on the gross domestic product (GDP) and fiscal tax revenue indicators profoundly impacts the degree of GEC. The official appraisal system since 1949 can be roughly divided into three stages (1949–1978, 1978–2002, and 2002–2019). Before China's economic reform and opening up, to consolidate the political order and the needs of a highly centralized planned economy, the main criterion for assessing officials was political loyalty. From the reform era to the beginning of the 21st century, however, economic development became the focus of work, and economic assessment was the principal criterion at this stage. With the 16th Congress of the Communist Party of China (CPC) in 2002 as the node, the officials' appraisal criteria gradually turned to a multidimensional appraisal with comprehensive economic-environmental-social coordination [18]. Although the official evaluation criterion is gradually reversing the drawback of focusing purely on the GDP, local officials still regard economic performance as a bargaining chip for

political promotion due to the high visibility of economic indicators and the lagging effect of environmental governance [25, 26]. In particular, unlike the promotion of high-level officials, which is influenced by noneconomic factors such as "nepotism," "political affiliation," and "loyalty" [27], the promotion of low-level officials is highly linked to economic performance.

There is a strict retirement policy in China's administrative system: 60 years for prefecture-level municipal officials and 65 for provincial ministerial-level officials. In 1986, the CPC Central Committee put forward the reform of rejuvenating the leadership team. Therefore, the age of officials has become an important consideration for political promotion. Further analysis reveals that the probability of promotion is inversely related to the length of tenure [25] and promotion incentives motivate local officials to attain economic achievements under limited terms. Therefore, this study proposes Hypothesis 1:

H1: In the context of perverse incentive structures and asymmetric information, promotion incentives will positively moderate the relationship between environmental regulations and environmental pollution, which is detrimental to environmental improvement.

3.3. Officials' Turnover to Deter GEC.

Information asymmetry of multiple dimensions often exists in transition economies. In addition to information asymmetry between the central and local governments, there is also information asymmetry between enterprises and local governments. China's traditional government-enterprise relationship has been characterized by dependency for thousands of years. Under such circumstances, enterprises are always incentivized to establish stable relationships with governments to obtain more resources efficiently. According to the survey of more than 12,000 enterprises in mainland China conducted by the World Bank in 2005, each enterprise spent an average of nearly 60 days a year, dealing with government core departments, and the top 5% of enterprises spent up to 170 days. Although different levels of government have implemented a series of initiatives to streamline administration and delegate powers since 2012, there are still some areas where "time tax" remains high for enterprises. If an official serves in a city long term, collusion is more likely to occur because it is easier to manipulate local regulators [28]. The exchange of officials has been incorporated as a formal system in the officials' governance since 1990. Under the current system, the transfer of officials does not require strict adherence to the tenure of the local leadership team but shows the characteristics of "flexible terms of office and transfers at any time." Frequent officials' turnover can break the stable collusive relationship [29] and create a politically sensitive period. The deterrent effect and uncertainty will be more substantial, especially when officials fall for corruption. Such collusive shocks and uncertainty can profoundly affect enterprises' behaviors [30, 31]. When corruption is significant in the environmental field, political instability caused by the officials' turnover can positively impact the stringency of environmental regulations. Corruption weakens the

seriousness of environmental regulations, but this effect disappears as political instability increases [32]. Therefore, the aforementioned discussion leads to the development of Hypothesis 2 which is as follows.

H2: Officials' turnover has a positive effect on breaking the collusion network, thus forming a politically sensitive period. Pollution will be curbed, and environmental regulations will be enforced. Consequently, officials' turnover will negatively moderate the relationship between environmental regulations and pollution, thereby contributing to environmental improvement.

Utilizing the two aforementioned hypotheses, the logical framework of this study is illustrated in Figure 1.

4. Methodology

4.1. Variable Selection

4.1.1. Dependent Variables.
Pollution emissions are mainly derived from industry, so environmental pollution is measured by three types of pollutants: industrial wastewater emissions, industrial soot emissions, and industrial sulfur dioxide (SO_2) emissions. These emissions include two dimensions of pollutant emissions per unit of industrial value added (i.e., WaterI, SootI, and SO_2I) and total pollutant emissions (i.e., water, soot, and SO_2).

4.1.2. Independent Variable.
Environmental regulation (ER) is the independent variable of this study. There is no unified standard for measuring environmental regulations, and related research studies use the pollutant emission compliance rate or pollution control input costs [33, 34]. These approaches can partly reflect the intensity of regional environmental regulations, but they also suffer from endogeneity. Chen et al. [35] proposed a method to use the frequency of environment-related terms (i.e., $PM_{2.5}$, PM_{10}, CO_2, SO_2, air, pollution, ecology, green, emissions, energy consumption, low carbon, environmental protection, emissions reduction, and chemical oxygen demand) in government work reports to measure environmental regulations. This method has two advantages: First, environment-related terms cover a wider range that more comprehensively measures regional environmental management efforts. Second, government work reports are usually released at the beginning of the year, and the following economic activities do not have a reverse impact, which can mitigate endogenous problems to a certain extent. Due to these advantages, our study draws on this method.

4.1.3. Moderator Variables.
Officials' promotion incentives (Age) are one of the moderator variables. The level of government in China is positively correlated with the division of labor between the party committee and the government. Party secretaries have become the de-facto core of decision-making. An official's age is an essential factor for measuring promotion incentives. According to the retirement age limit of 60 years for the leading positions of prefecture-level municipalities, 55 years is generally
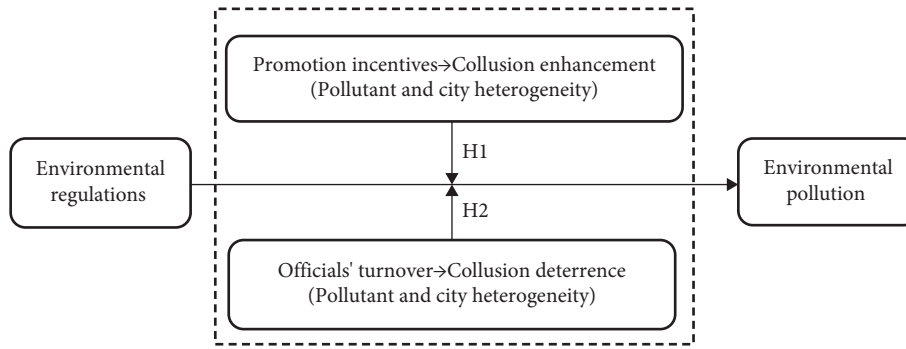
Figure 1: Logical framework.

a turning point for the strength of promotion incentives. Party secretaries are high-incentive officials if they are under 55 when they take office and low-incentive officials if they are 55 and older [36]. Following this logic, promotion incentives are characterized based on the party secretary's age when taking office, denoted as Age. Age is recorded as 1 when the party secretary takes office at an age less than 55 and 0 when it is greater than or equal to 55.

Officials' turnover (Turnover) is another moderator variable. According to the existing method, turnover is equal to 1 if replacement happens and 0 otherwise. If replacement happens before June 30, we set that year as turnover and the following year as otherwise.

4.1.4. Control Variables. In addition to environmental regulations, other factors may also affect environmental improvement. We adopt the following control variables to eliminate the effects of noncritical factors [37]:

(i) City scale (CityScale): the reasonable city scale can reduce pollution emissions and improve environmental governance by enhancing the division of labor [38]. We use the total population of a municipal district as a proxy for the city scale.

(ii) Technology level (Technology): the level of technology is an essential factor for determining pollutant emissions. It is expressed by the number of green invention patent applications in each city.

(iii) Industrial structure (Industry): the secondary sector, specifically industry, is the principal source of pollutant emissions. The industrial structure is measured by the share of industrial value added in the city's GDP.

(iv) Opening-up level (Open): the higher the level of openness in a region, the more deeply it can participate in the division of labor and absorb advanced external technology efficiently. We employ the actual amount of foreign investment used as a proxy for the opening-up level.

(v) Economic development (Economy): economic development and pollution are closely linked. We use the per capita GDP to measure a region's economic development level.

4.2. Data Source. The study manually collected the data on 276 cities from 2003 to 2019 based on availability. Relevant data were obtained from the Statistics Yearbooks of China 2004–2020, the Statistics Yearbooks of China City 2004–2020, government work reports, and the Database of the National Bureau. The information on party secretaries was available from the Database of China Local Party and Government Leaders. All indicators involving price factors were deflated to the year 2003 by the relevant price indices to weaken the influence of inflation factors on data fluctuations. The variables were treated with a logarithm to reduce the influence of fluctuation and heteroscedasticity with the exception of dummy variables.

4.3. Model Specification. To capture the moderating effect of promotion incentives on the effectiveness of environmental regulations, we constructed the following benchmark model with the example of wastewater emissions as

$$\text{Water}I_{it} = \beta_0 + \beta_1 \text{ER}_{it} + \sum \beta_j \text{CV}s + \eta_i + \mu_{it}, \quad (1)$$

where i and t denote the city and year, respectively. β_0 is the constant term, and the coefficient of β_1 indicates the impact of environmental regulations on environmental improvement. β_j denotes the regression coefficient for each control variable. Finally, η_i and μ_{it} represent the city effect and the random error term, respectively.

The moderator variables are centralized; subsequently, the interaction terms of environmental regulations with promotion incentives and officials' turnover are introduced based on the benchmark model, as shown in Equations (2) and (3). The coefficient of α_1 in Equations (2) and (3) is the central interest as it indicates the moderating role of promotion incentives and officials' turnover. If the coefficient of

the interaction term is significant, it suggests that moderating effects exist.

$$\mathrm{Water}I_{\mathrm{it}} = \beta_0 + \beta_1 \mathrm{ER}_{\mathrm{it}} + \alpha_1 \left(\mathrm{ER}_{\mathrm{it}} * \mathrm{Age}_{\mathrm{it}} \right) + \alpha_2 \mathrm{Age}_{\mathrm{it}} + \sum \beta_j \mathrm{CV}s + \eta_i + \mu_{\mathrm{it}}, \tag{2}$$

$$\mathrm{Water}I_{\mathrm{it}} = \beta_0 + \beta_1 \mathrm{ER}_{\mathrm{it}} + \alpha_1 \left(\mathrm{ER}_{\mathrm{it}} * \mathrm{Turnover}_{\mathrm{it}} \right) + \alpha_2 \mathrm{Turnover}_{\mathrm{it}} + \sum \beta_j \mathrm{CV}s + \eta_i + \mu_{\mathrm{it}}. \tag{3}$$

5. Empirical Results and Analysis

5.1. Summary Statistics. Table 1 reports the results of descriptive statistics for variables. The emissions of various pollutants and the level of environmental regulations vary greatly due to different stages of development. Figure 2 depicts the age of party secretaries taking office and the corresponding number of secretaries. Findings show that the large number of party secretaries takes office at age 53, a total of 148, accounting for 11.41% of the total sample. Figure 3 depicts the number of cities with party secretary turnovers, and a total of 1,296 turnovers occurred within the sample. The high-frequency years for party secretary changes are 2003, 2008, 2013, and 2017; these years correlate mainly to local transitions surrounding the Congress party.

5.2. Benchmark Regression and Robustness Tests

5.2.1. Benchmark Regression Results. The covariance test is performed on the variables before regression analysis. The results show that the variance inflation factor values are all less than 10, so there is no multicollinearity among the variables. Table 2 lists the benchmark regression results with the emission intensity of each pollutant as the dependent variable. It is found that the estimated coefficients of environmental regulations for each pollutant category are always negative and are all significant at the 1% level ($\beta_1 = -0.314$, $p < 0.01$; $\beta_1 = -0.111$, $p < 0.01$; $\beta_1 = -0.266$, $p < 0.01$; $\beta_1 = -0.122$, $p < 0.01$; $\beta_1 = -0.470$, $p < 0.01$; and $\beta_1 = -0.157$, $p < 0.01$, respectively); that is, environmental regulations effectively reduce the emission intensity of each pollutant. Environmental regulations have improved green production and resource utilization efficiency by encouraging enterprises to invest more in research so as to eliminate the backward production capacity. This is also consistent with the reality that China's environment has gradually improved in recent years. For the control variables, the estimated coefficients are generally consistent with expectations.

5.2.2. Robustness Tests. Robustness tests are performed by reducing the endogeneity and replacing the dependent variables.

(1)Endogeneity. The explanatory variables are endogenous when correlated with the random perturbation term, which results in biased regression results. The omitted variables and reciprocal causality are important reasons for endogeneity. Individual fixed-effects models can be used for omitted variables to reduce the effect of unobservable factors, while the reciprocal causality problem needs to be solved with the instrumental variable (IV) approach. Environmental pollution could have a reverse effect on environmental regulations, mainly because the government may introduce more regulatory policies on environmental governance when the area suffers from pollution seriously. The choice of IV is highly artistic and creative. Since it is challenging to choose IV for environmental regulations, based on relevant research [39, 40], our study starts from the lagged term of endogenous variables. The lagged term of environmental regulations is highly correlated with current environmental regulations. In contrast, environmental pollution in the current period does not affect the level of previous environmental regulations, so the lagged term of environmental regulations initially satisfies the IV requirement. Therefore, this study chooses the one-period lag of environmental regulations as the IV. The benchmark regression is reanalyzed using two-stage least squares (2SLS), and the relevant results are listed in Table 3 The underidentification test and the weak IV test indicate that the IV is reasonable. Comparing the results in Table 2, the estimated coefficients of environmental regulations are all correspondingly higher ($\beta_1 = -0.281$, $p < 0.01$; $\beta_1 = -0.477$, $p < 0.01$; and $\beta_1 = -0.442$, $p < 0.01$, respectively) after controlling endogeneity, indicating that the benchmark regressions mixed with endogeneity tend to underestimate the improvement effect of environmental regulations. In summary, after considering endogeneity, the direction and significance of the impact remain unchanged although the value fluctuates to some extent. Consequently, the benchmark regression results are robust and reliable on the whole.

(2) Substitution of Dependent Variables. By replacing the dependent variables in the benchmark regression from pollutant emission intensity to pollutant emissions, the corresponding regression results are reported in Table 4. The findings indicate that, except for slight fluctuations in the magnitude of the estimated coefficients, the effect of environmental regulations on all types of pollutants is still significantly negative ($\beta_1 = -0.155$, $p < 0.01$; $\beta_1 = -0.081$, $p < 0.01$; $\beta_1 = -0.107$, $p < 0.01$; $\beta_1 = -0.091$, $p < 0.01$; $\beta_1 = -0.348$, $p < 0.01$; and $\beta_1 = -0.127$, $p < 0.01$, respectively), indicating that environmental regulations do have a positive effect on reducing both the intensity of pollutant emissions and the total amount of pollutant emissions.

Table 1: Descriptive statistics of the main variables.

Variable set	Variables	N	Mean	Sd	Min	Max
Dependent variables	WaterI (t/10^4 yuan)	4692	30.907	50.761	1.181	2069.061
	Water (10^4t)	4692	7132	9748	48	96501
	SootI (t/10^4 yuan)	4692	0.017	0.046	0	1.535
	Soot (10^4t)	4692	2.916	7.770	0.004	325.726
	SO$_2$I (t/10^4 yuan)	4692	0.028	0.037	0	0.488
	SO$_2$ (10^4t)	4692	5.296	5.921	0.006	68.316
Independent variables	ER (number)	4692	25	15	1	110
Moderator variables	Age (0, 1)	4692	0.789	0.408	0	1
	Turnover (0, 1)	4692	0.277	0.447	0	1
Control variables	CityScale (10^4p)	4692	145	193	14	3190
	Technology (number)	4416	280	1125	0	26435
	Industry (%)	4692	47.78	10.88	9	90.97
	Open (10^4 yuan)	4692	479313	1186146	0	20478082
	Economy (10^4 yuan/p)	4692	1.539	1.568	0.189	21.050
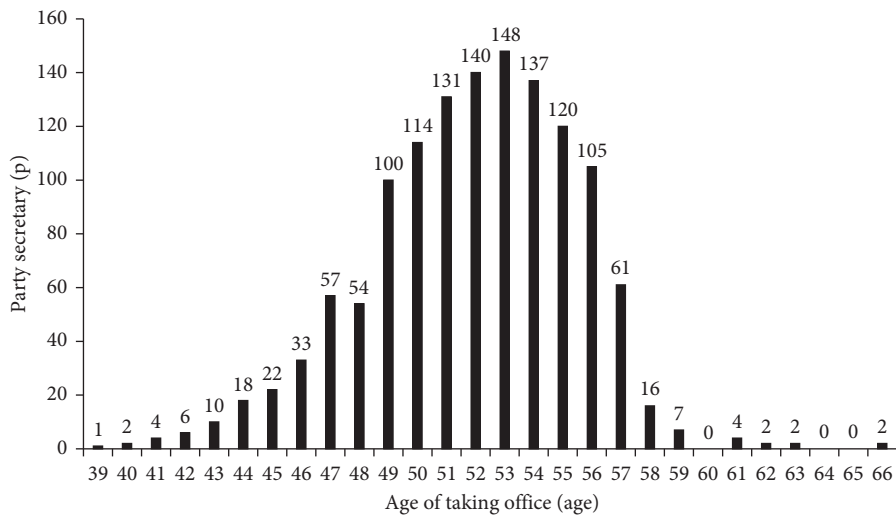
Figure 2: Age and frequency of party secretaries taking office.
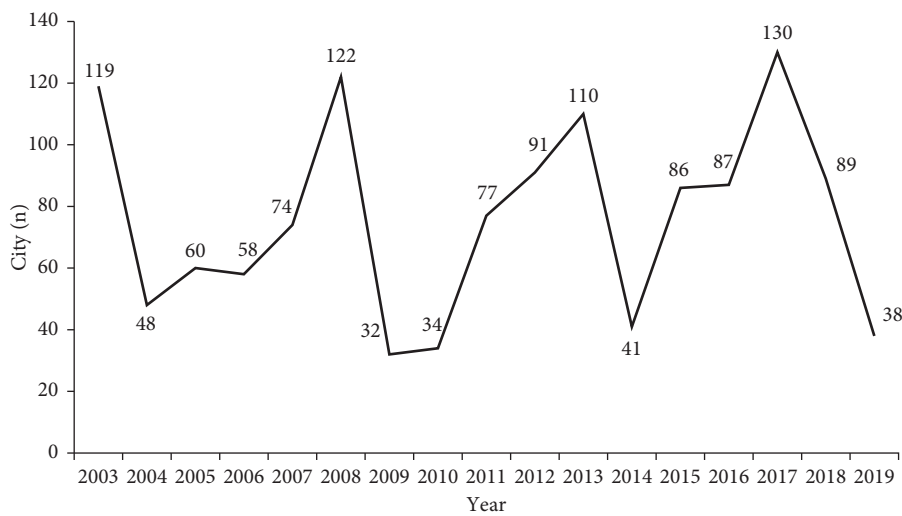
Figure 3: Number of cities with party secretary turnovers.

TABLE 2: Benchmark regression results of environmental regulations on environmental pollution.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	WaterI		SootI		SO$_2$I	
ER	-0.314^{***} (-27.95)	-0.111^{***} (-7.07)	-0.266^{***} (-16.66)	-0.122^{***} (-5.04)	-0.470^{***} (-12.93)	-0.157^{***} (-7.13)
CityScale		-0.008 (-0.31)		-0.007 (-0.16)		-0.208^{***} (-5.35)
Technology		-0.172^{***} (-22.26)		-0.093^{***} (-7.88)		-0.355^{***} (-32.67)
Industry		-0.108^{***} (-3.04)		-0.055 (-1.01)		0.154^{***} (3.08)
Open		-0.021^{***} (-3.36)		-0.035^{***} (-3.63)		-0.017^{**} (-2.01)
Economy		-0.232^{***} (-8.47)		-0.195^{***} (-4.64)		-0.130^{***} (-3.39)
Constant	-5.199^{***} (-148.77)	-2.331^{***} (-7.80)	-3.963^{***} (-79.72)	-1.611^{***} (-3.52)	-2.730^{***} (-24.03)	-0.657 (-1.57)
N	4692	4692	4692	4692	4692	4692
R^2	0.150	0.277	0.059	0.075	0.082	0.406
City fixed	Yes	Yes	Yes	Yes	No	Yes

Note. The numbers in brackets stand for t-statistics; *, **, and *** indicate significance at the level of 10%, 5%, and 1%, respectively, which are the same in the following tables except Table 3.

TABLE 3: IV-2SLS results.

Variables	(1)	(2)	(3)
	WaterI	SootI	SO$_2$I
ER	-0.281^{***} (-5.92)	-0.477^{***} (-6.54)	-0.442^{***} (-7.18)
Control variables	Yes	Yes	Yes
N	4692	4692	4692
R^2	0.255	0.023	0.380
City fixed	Yes	Yes	Yes
Kleibergen–Paap rk LM	269.455 (0.001)	269.455 (0.001)	269.455 (0.001)
Cragg–Donald Wald F	557.115	557.115	557.115

Note. The numbers in brackets stand for z-statistics; the numbers in the square bracket stand for p value; *, **, and *** indicate significance at the level of 10%, 5%, and 1%, respectively.

TABLE 4: Benchmark regression robustness test with replacement of dependent variables.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Water		Soot		SO$_2$	
ER	-0.155^{***} (-14.08)	-0.081^{***} (-5.14)	-0.107^{***} (-6.69)	-0.091^{***} (-3.72)	-0.348^{***} (-20.21)	-0.127^{***} (-5.51)
Constant	8.770^{***} (256.18)	7.009^{***} (23.44)	10.005^{***} (200.63)	7.727^{***} (16.65)	11.350^{***} (211.97)	8.673^{***} (19.83)
Control variables	No	Yes	No	Yes	No	Yes
N	4692	4692	4692	4692	4692	4692
R^2	0.043	0.195	0.010	0.044	0.084	0.348
City fixed	Yes	Yes	Yes	Yes	Yes	Yes

5.3. Moderating Effect Tests

5.3.1. The Moderating Effect of Promotion Incentives.
Theoretically, promotion incentives may have a moderating effect on the effectiveness of environmental regulations through GEC. To prove Hypothesis 1, we obtain the relevant regression results through Equation (2). To verify the robustness of the regression results, tenure is included in delineating the strength of promotion incentives. The study examined two scenarios that included 3-year tenure and 5-year tenure and one that did not include the year-by-year promotion incentive delineation criteria. Specifically, columns (2) and (3), columns (5) and (6), and columns (8) and (9) of Table 5 show that the coefficients of interaction terms in both soot and SO$_2$ are positive and significant ($\alpha_1 = 0.053$, $p < 0.05$; $\alpha_1 = 0.044$, $p < 0.05$; $\alpha_1 = 0.036$, $p < 0.01$; $\alpha_1 = 0.019$, $p < 0.05$; $\alpha_1 = 0.044$, $p < 0.01$; and $\alpha_1 = 0.038$, $p < 0.01$, respectively). Promotion incentives have a positive

moderating effect on the relationship between environmental regulations and air pollution. Since pollutant emission intensity is an inverse indicator, high promotion incentives weaken the effectiveness of environmental regulations for both categories of air pollutants in all three classification cases. In contrast, the positive moderating effect of promotion incentives is insignificant in wastewater and even shows a negative moderating effect ($\alpha_1 = -0.012$, $p < 0.10$) in the 5-year tenure criterion. Ulteriorly, it reveals that the distorting effect of promotion incentives on environmental regulations is more likely to occur in the area of air pollutants instead of water pollution from the perspective of GEC. Thus, Hypothesis 1 is partially verified because it does not consider pollutant heterogeneity.

The heterogeneity in the moderating effect of promotion incentives on different pollutants may be associated with the variation in pollutant spillover. Compared with wastewater, air pollutants have a substantial spillover. Especially in the

TABLE 5: The moderating effect of promotion incentives.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	3-year tenure criterion			5-year tenure criterion			Without considering tenure		
	WaterI	SootI	SO$_2$I	WaterI	SootI	SO$_2$I	WaterI	SootI	SO$_2$I
ER	−0.099*** (−4.88)	−0.172*** (−5.50)	−0.198*** (−6.95)	−0.076*** (−3.10)	−0.225*** (−6.01)	−0.212*** (−6.20)	−0.111*** (−5.26)	−0.220*** (−6.84)	−0.244*** (−8.27)
ER* Age	−0.013 (−0.94)	0.053** (2.53)	0.044** (2.29)	−0.012* (−1.90)	0.036*** (3.61)	0.019** (2.11)	−0.001 (−0.02)	0.044*** (4.63)	0.038*** (4.43)
Age	−0.015 (−0.84)	0.004 (0.16)	0.035 (1.38)	−0.030 (−1.51)	−0.020 (−0.65)	0.026 (0.95)	0.007 (0.43)	0.065*** (2.58)	0.042* (1.83)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4692	4692	4692	4692	4692	4692	4692	4692	4692
R^2	0.277	0.077	0.407	0.278	0.078	0.407	0.277	0.083	0.410
City fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

research sample where prefecture-level cities dominate, the spillover is more significant due to the small area of jurisdiction. Moreover, air pollutants are more likely diluted and diffused by the wind. Therefore, the benefits and costs of air pollution control will be uncertain if relevant systems and collaborative governance mechanisms are not sound. Air pollutant emissions are prone to resulting in beggar-thy-neighbor situations and "race to the bottom" competitions. The spillover of wastewater is weak, and the boundary is clearly defined. With the implementation of the "river chief system," the four-level river chief system (i.e., province, city, county, and township) in China has been established; the river chief system is also maintained by the key leaders of local governments. The river chief system adds political factors to water pollution control and promotes "yardstick competition" among regions. In the context of gradually increasing environmental performance appraisal, strengthening water pollution control can also give local officials a green label and increase promotion leverage to some extent.

To mitigate side effects caused by focusing on economic growth alone, the evaluation of officials has moved in a comprehensive and coordinated multidimensional direction. The central government has placed considerable value on green development since the 18th CPC National Congress in 2012, and the proportion of environmental indicators used in evaluating officials has also gradually increased. Therefore, taking 2012 as the node, we examine whether the moderating effect of promotion incentives changes by dividing the whole sample into two periods: 2003–2012 and 2013–2019. To save space, we only report the coefficients of interaction terms in the moderating effect model in Table 6 (we do the same in Tables 7 and 8). The comparison between the two different periods shows that the positive moderating effect of promotion incentives on air pollutants has increased numerically and significantly in varying degrees from 2013 to 2019, which implies that the official governance has not effectively reversed the trend of GEC in air pollutants. The moderating effect of promotion incentives on water pollution does not change significantly in the two periods, and neither period reaches statistical significance.

Although the environmental assessment indicators for officials are gradually increasing, it is awkward that the binding force is still limited. Environmental governance requires long-term investment and has a significant lag in effectiveness. It may be difficult to see the results of environmental governance within limited tenure, but it increases the performance of the next official. Therefore, local officials do not have sufficient incentives to invest in environmental governance. Furthermore, compared with the direct positive incentive of economic growth on officials' promotion, the current environmental appraisal is mainly in the form of "punishment," which means that local officials will be held accountable only when major environmental accidents occur in their jurisdictions. We also notice that anticorruption efforts have increased unprecedentedly [41] and corruption behaviors have been effectively deterred since 2012. However, the empirical results do not show that promotion

incentives have a weakened positive moderating effect on the effectiveness of environmental regulations. This is primarily because the concept of GEC used in this study contains not only corrupt collusion but also the complicity of local governments in allowing enterprises to adopt an unclean production mode for economic growth [42]. The latter, which accounts for the majority, is mainly caused by an extensive development concept without corruption and benefit exchange.

Significant differences exist between the city level and developmental stage among cities (municipalities, provincial capital cities, independent planning cities, and ordinary prefecture-level cities). Therefore, there should be heterogeneity in the moderating effect of promotion incentives among different city levels. The sample of 276 cities is divided into 243 ordinary prefecture-level cities (abbreviated as general cities) and 33 municipalities, provincial capital cities, and independent planning cities (abbreviated as high-level cities) to explore heterogeneity. The regression results for subsamples are presented in Table 7. Specifically, in the case of water pollution, columns (1), (4), and (7) show that the coefficients of the interaction terms are small and do not reach statistical significance in 243 general cities. In high-level cities, the coefficients are significantly negative ($\alpha_1 = -0.044$, $p < 0.01$ and $\alpha_1 = -0.023$, $p < 0.10$) in columns (4) and (7), except at the 3-year tenure criterion. In the case of soot, columns (2), (5), and (8) show that the coefficients of the interaction terms are significantly positive ($\alpha_1 = 0.046$, $p < 0.05$; $\alpha_1 = 0.044$, $p < 0.01$; and $\alpha_1 = 0.052$, $p < 0.01$, respectively) in general cities; in high-level cities, it is only significant at the 10% level ($\alpha_1 = 0.105$, $p < 0.10$) with the 3-year term criterion in column (2). In terms of SO_2, the moderating effect of promotion incentives is not significantly different between general and high-level cities.

Overall, promotion incentives in high-level cities have a more substantial negative moderating effect and a weaker positive moderating effect on the relationship between environmental regulations and environmental pollution than in general cities. Several reasons can account for this phenomenon. On the one hand, high-level cities have more stringent environmental standards and higher public demand for the environment. Moreover, compared with general cities, high-level cities are already at a more advanced economic developmental stage and have a weaker motivation to develop the economy by destroying the environment. On the other hand, high-level cities experience a more robust legal system and vigorous public scrutiny, which increase the cost of collusion and the chances of exposure accordingly. As a result, high-level cities tend to be more cautious about collusion.

5.3.2. The Moderating Effect of Officials' Turnover.
Frequent turnover of principal local officials will disrupt the existing collusion network and create a sensitive deterrent period, thus restraining the behavior of all parties. As a result, officials' turnover may negatively moderate the relationship between environmental regulations and pollution, thereby contributing to environmental improvement. The

TABLE 6: The moderating effect of promotion incentives under different periods.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	3-year tenure criterion			5-year tenure criterion			Without considering tenure		
	WaterI	SootI	SO_2I	WaterI	SootI	SO_2I	WaterI	SootI	SO_2I
2003–2012	−0.002 (−0.16)	0.005 (0.22)	−0.002 (−0.16)	−0.011 (−1.50)	0.029** (2.40)	0.009 (1.12)	−0.003 (−0.48)	0.021* (1.79)	0.012 (1.60)
2013–2019	−0.031 (−1.56)	0.041 (1.32)	0.071** (2.09)	0.001 (0.14)	0.048*** (3.02)	0.055*** (3.11)	0.007 (0.79)	0.039*** (2.67)	0.048*** (2.98)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 7: The moderating effect of promotion incentives under city heterogeneity.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	3-year tenure criterion			5-year tenure criterion			Without considering tenure		
	WaterI	SootI	SO_2I	WaterI	SootI	SO_2I	WaterI	SootI	SO_2I
General cities	−0.007 (−0.54)	0.046** (2.05)	0.024 (1.22)	−0.005 (−0.75)	0.044*** (3.99)	0.013 (1.42)	0.008 (1.22)	0.052*** (5.16)	0.034*** (3.82)
High-level cities	−0.029 (−0.96)	0.105* (1.86)	0.117** (2.38)	−0.044*** (−3.24)	−0.010 (−0.42)	0.022 (0.98)	−0.023* (−1.69)	−0.004 (−0.18)	0.013 (0.62)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 8: The moderating effect of officials' turnover under city heterogeneity.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample			Sample excluding peak years of turnover		
	WaterI	SootI	SO$_2$I	WaterI	SootI	SO$_2$I
General cities	−0.025*** (−3.28)	0.005 (0.50)	−0.019* (−1.85)	−0.018* (−1.96)	0.003 (0.27)	−0.023* (−1.80)
High-level cities	−0.007 (−0.51)	0.047* (1.66)	0.006 (0.24)	−0.008 (−0.40)	0.047 (1.42)	0.042 (1.29)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
City fixed	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 9: The moderating effect of officials' turnover.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample			Sample excluding peak years of turnover		
	WaterI	SootI	SO$_2$I	WaterI	SootI	SO$_2$I
ER	−0.095*** (−5.57)	−0.136*** (−5.20)	−0.144*** (−6.05)	−0.096*** (−5.07)	−0.146*** (−5.24)	−0.141*** (−5.38)
ER* L.Turnover	−0.018** (−2.52)	0.015 (1.38)	−0.014 (−1.45)	−0.017** (−2.05)	0.009 (0.73)	−0.012 (−1.00)
L.Turnover	0.013 (0.83)	−0.054** (−2.22)	−0.054** (−2.42)	0.007 (0.38)	−0.054* (−1.90)	−0.074*** (−2.78)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
N	4692	4692	4692	3588	3588	3588
R^2	0.278	0.077	0.407	0.267	0.093	0.391
City fixed	Yes	Yes	Yes	Yes	Yes	Yes

relevant regression results shown in Table 9 are obtained by Equation (3) to test Hypothesis 2. Considering the lagged effect of officials' turnover, we take a one-period lag of officials' turnover. Moreover, according to Figure 3, the years (2003, 2008, 2013, and 2017) are the peak years for turnover, and the sample of these 4 years is excluded to reduce the impact of predictable turnover; corresponding results are shown in columns (4)–(6) of Table 9. From the full-sample regressions in columns (1)–(3), the findings show that similar to the moderating heterogeneity of promotion incentives, the moderating effect of officials' turnover is also significantly heterogeneous across pollutants. From the results presented in column (1), the coefficient of the interaction term in wastewater is negative and significant at the 5% level ($\alpha_1 = -0.018, p < 0.05$), indicating that officials' turnover has a negative moderating effect on the relationship between environmental regulations and water pollution. Consequently, it further suggests that officials' turnover has a deterrent effect on water pollution collusion, which will facilitate the effectiveness of environmental regulations. In the area of air pollutants, soot, and SO$_2$, the moderating effect of officials' turnover is insignificant. Although the coefficient of the interaction term in SO$_2$ is negative ($\alpha_1 = -0.014$), it does not reach statistical significance. After excluding the peak years of turnover, the significance of the estimated coefficients does not change compared to that of the whole sample, with only minor fluctuations in values.

Compared to wastewater, air pollutants have a high spillover and boundaries are more blurred. Even though officials' turnover can create shock damage to collusion, the deterrent effect on air pollutants is weak. Hypothesis 2 is also partially verified.

Following the idea that the moderating effect of promotion incentives is heterogeneous under different city levels, is there also city-rank heterogeneity in the moderating effect of officials' turnover? Therefore, based on the

classification of the city rank mentioned above, this study examines differences in the moderating effects of officials' turnover under city-rank heterogeneity, and the results are presented in Table 8. Columns (1) and (3) show that the coefficients of the interaction terms are significantly negative ($\alpha_1 = -0.025$, $p < 0.01$ and $\alpha_1 = -0.019$, $p < 0.10$), which means that officials' turnover negatively moderates the intensity of wastewater and SO$_2$ emissions in general cities. By contrast, only one coefficient of the interaction term is negative ($\alpha_1 = -0.007$) in the intensity of wastewater emissions in high-level cities in column (1), but it does not reach statistical significance. Moreover, from columns (4)–(6), after excluding the peak years of turnover, the direction of the moderating effect does not change, with only minor fluctuations in values and significance.

Compared with high-level cities, the collusion deterrent effect caused by officials' turnover is more significant in improving the effectiveness of environmental regulations in general cities. General cities still lag in terms of the development stage, legal environment, and government-enterprise relationship, and enterprises depend more on local governments. Therefore, the effect of fractured collusion networks caused by official mobility can be more profound in general cities.

6. Conclusions and Policy Recommendations

6.1. Conclusions.
Environmental pollution limits the sustainability of economic development and significantly impacts the transmission capacity and pathogenicity of COVID-19. Therefore, effective environmental management will create a win-win situation for the ecological civilization and COVID-19 pandemic control. Based on the novel perspective of GEC, this study constructs a theoretical logic framework to explore the moderating effects of officials' promotion incentives and turnover on the effectiveness of

environmental regulations using the balanced panel data from 276 cities in China from 2003 to 2019. To sum up, the main findings are as follows: First, environmental regulations do effectively restrain environmental pollution, including pollutant emission intensity and total emissions. Second, the positive moderating effect of promotion incentives on the effectiveness of environmental regulations is reflected in air pollutants but is not conspicuous in water pollution. In the new developmental stage (2013–2019), the binding force of the officials' environmental appraisal is still limited, so the moderating effect of promotion incentives remains predominantly positive. In terms of city-level heterogeneity, compared with general cities, promotion incentives in high-level cities have a weaker positive but a more potent negative moderating effect. Third, the collusive deterrent effect of officials' turnover negatively moderates the effectiveness of environmental regulations mainly in water pollution rather than air pollution. Compared with high-level cities, officials' turnover in general cities is more conducive to the effectiveness of environmental regulations.

6.2. *Policy Recommendations.* Strengthening pollution management and implementing green development are sufficient guarantees to coordinate COVID-19 controls and social development. The economic development model is the internal logic behind the moderating effects of promotion incentives and official turnover on the efficiency of environmental regulations. Transition economies represented by China have abundant labor resources but generally weaker social institutions and high transaction costs, so they rely on massive resource inputs to drive economic growth in the early developmental stages. GEC is the primary institutional driver of extensive development, which satisfies the parties' frenzied pursuit of economic growth in the short term. The extensive development model, characterized by high input, heavy pollution, and low efficiency, is unsustainable with the disappearing demographic dividend, tightening resource constraints, and rising transaction costs. Therefore, it is necessary to gradually improve the system construction, cut off the chain of GEC, and release the innovative vitality of enterprises to make the transformation into an intensive development model [43]. Otherwise, it is straightforward to fall into the middle-income trap. To break away from the sloppy development model, the following policy recommendations are also essential for transition economies with national conditions similar to those in China:

(1) Scientific resumption of production: Owing to the severe economic impact of COVID-19, governments are prone to boosting the economy in the short term by relaxing regulatory policies, which may lead to a high incidence of GEC. Therefore, governments at all levels should firmly establish the concept of green development and scientifically organize the resumption of work and production; otherwise, the stimulation of the economy at the expense of the environment may lay a hidden danger for the spread of the COVID-19 virus.

(2) Rethink the evaluation mechanism of officials: The evaluation mechanism determines the behavior of local officials. In addition to increasing the weight of environmental indicators, the central government should innovate and adjust officials' evaluation methods, which are invariably in the form of "punishment." Dredging environmental pressure transmission can reverse local officials' one-sided pursuit of GDP and shape the official governance model of "growth for harmony."

(3) Accelerate the formation of regional joint governance mechanisms: For pollutants with a high spillover, the regional-coordinated governance mechanism can be formed by strengthening the vertical management of central-level or upper-level governments. The externality of pollution is gradually internalized to reduce the race to the bottom by forming a regional coordination governance mechanism.

(4) Clarify the division of responsibilities: The "lifelong responsibility system for environmental damage" restrains wanton pollution behaviors under promotion incentives by setting policy red lines. However, the system still needs a more precise division of responsibilities and a perfect procedure to achieve realistic and lifelong responsibility.

(5) Strengthen the legal system: While the officials' turnover may have a deterrent effect on collusion, new collusion networks can quickly emerge. Therefore, relying on the officials' turnover to improve the environment is not a long-term solution. A more sustainable plan is to improve the legal system and build a new type of proclear government-enterprise relationship.

6.3. *Limitations and Future Research Directions.* The limitations of this study point the way to future research, and three limitations stand out. First, the robustness of the empirical results can be further verified using additional measures of promotion incentives as well as mayoral data. In addition to the age factor, external factors such as GDP growth rates, fiscal surplus, and unemployment rates also measure promotion incentives in different dimensions. Mayors are an important faction that influences the regional economy, so the robustness of the results can be further tested by using multiple promotion incentive measures and combining them with mayoral data. Second, the impact of heterogeneity in the types of officials' turnover on collusion deterrence needs to be focused on. Officials' turnover includes retirement, promotion, reassignment, and corruption, which may cause differences in the damage degree of GEC. Therefore, future research studies should probe the impact of this variability by grouping or setting up dummy variables. Third, more pollutants need to be included in future research studies. Integrating data availability and workload, three representative pollutants (wastewater, soot, and SO_2) were included in this study. Solid waste with lower

spillover and nitrogen oxides in air pollutants can be introduced to further verify the robustness of the relevant results.

Data Availability

The original contributions presented in the study are included in the article/supplementary material, and further inquiries can be directed to the corresponding authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest..

Authors' Contributions

All the authors undertook research, writing, and review tasks throughout this study. All authors have read and agreed to the published version of the manuscript.

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Research Article

Community Construction and Development Path Analysis of Ecological Environment-Friendly Elderly Care Service

Jie Guo,[1] Wenjie Li,[2] and Wenhao Ling [3]

[1]*Institute of Administration Study, Henan University, Kaifeng, Henan, China*
[2]*School of Public Administration, North China University of Water Resources and Electric Power, Zhengzhou, Henan, China*
[3]*Institute of Social Governance Research Center, Henan University, Kaifeng, Henan, China*

Correspondence should be addressed to Wenhao Ling; lwh@henu.edu.cn

As a new pension model, ecological pension is an important choice to relieve the pressure of population aging in China. This paper reviews the relevant literature on the integrated development of the ecological pension industry and rural revitalization in recent years and points out that the researchers have determined the model of the ecological pension industry, the path of rural revitalization, the comprehensive development of organic pension industry, and rural revitalization and the problems they face. Some results have been achieved. However, there is still a lot of research space for the integrated development of the ecological pension industry and rural revitalization, especially to establish a perfect index system of the ecological pension industry, the measurement standard of rural revitalization, and the theoretical basis and mechanism of integrated development. Regional cooperative symbiosis is based on industrial symbiosis. In terms of research methods, attention should be paid to the combination of theoretical analysis and empirical research, to the further development of this field, and to achieve remarkable results. In the process of social and economic development, the rural ecology can be built by solving the problems of the elderly, accurately reducing rural poverty, and protecting the environment. The healthy elderly care tourism destination has realized the integrated development of rural tourism, ecological health tourism, and elderly care tourism. Taking Chang'an District of Xi'an as an example, the advantages of the district in geographical location, climate, environment, tourism resource health, as well as the constraints in the system, talent, policy, and system are demonstrated, and the corresponding countermeasures are put forward.

1. Introduction

With the acceleration of population aging, the reduction of family size, the mobility of the labor force, and the weakening of family relations, the traditional home care model can no longer meet the needs of the elderly. While home care is unsustainable, scientists note that providing Jolo services is an important trend to address the challenges of an aging population. Local governments actively promote the nonprofit model, and they also encounter many problems and challenges in the process of development. In particular, the imbalance and shortage of welfare benefits, resource allocation, and regional differences are significant. The unbalanced and insufficient development of nonprofit services at home and abroad hides the core attribute of public goods and the core value of fairness and accessibility.

People need more qualities and happiness in their later years. On August 23, 2020, the Ministry of Civil Affairs announced its latest forecast. During the four-year and five-year plan (2021–2025), China's elderly population (over 60 years old) has exceeded 300 million, leading to mild to moderate aging. In five to 10 years, China's first parents have entered the elderly stage, and the national pension institutions are a direct challenge to the challenges and tests. With the rapid development of China's pension industry, new models, new technologies, and new businesses are constantly driving new changes. More and more older people want to enrich their lives and improve their health. In this context, the rural ecological industry has gradually become a major development direction in the new era. With the development of information technology, community

information platforms and sensor network systems of pension organizations constantly appearing, making the ecological pension industry more intelligent and scientific. In recent years, pension organizations have failed to meet the needs of the elderly [1]. With the planning and construction of many suburban gardens, farms, farms, and rural farms, the principle of development centered on the quality of life for the elderly was further implemented, as shown in Table 1.

2. State of the Art

2.1. The Urgent Need for Pension Services. As shown in Table 2, ecotourism is a way of tourism appearing along with the aging of the population and the improvement of the subhealth level. This study aims to develop in-depth tourism experiences based on natural and cultural environments. Senior travel is essentially a vacation for the elderly. That is to say, the elderly leave the original residential area and travel to a good destination for half a year, engaged in leisure, vacation, sightseeing, leisure, and other activities. Elderly tourism is a new integration of the elderly and tourism, which can not only improve the quality of life of the elderly but also reduce the social pressure on the elderly, alleviate the problem of seasonal tourism facilities in tourist destinations, and promote the development of tourism [2].

China is entering an aging society. According to the latest statistics, 17.9 percent of China's population is over 60. Elderly care is an important issue in Japan. As China's national income grows, tourism has become a new fashion for the elderly. Especially when the scenery is beautiful and the air is fresh and back to the comfortable rural sightseeing place, the elderly can meet their sightseeing needs and jro needs. Therefore, for the healthy elderly people with high economic burdens, it is a new trend to receive elderly care services in rural ecotourism.

2.1.1. Government-Led, Multisubject System. For the elderly, the government only builds the infrastructure for the elderly. Public finance and society raise funds, invest in infrastructure, and provide pension services. Under the active guidance of various social groups and organizations, the government has formed a nonprofit network composed of companies and volunteer service organizations to significantly reduce the pressure on the government. At the same time, the government will start by providing complex and specific services, better playing the leading role of the government, and using various social resources to improve the operational efficiency of [3], as shown in Table 3.

2.1.2. Perfect Infrastructure for the Elderly. As shown in Figure 1, it is said to be one of the most suitable countries for elderly people in the world, with perfect social security facilities. In March 2016, the government launched the "Happy Aging of the Elderly" program to care for the elderly in the construction of various communities. The first floor has plenty of space for community organizations, kindergartens, education centers, community hospitals, senior citizens' activities, and markets convenient transportation.

The bus station has a special corridor where old people do not slip in the weather. The city also has daycare centers and rehabilitation centers, providing services to elderly families with children. However, communities with special needs offer a variety of white-and-white meetings and activities to enrich the lives of older people. These measurements are very fine. However, from the interest in this daily life, older people in Singapore can enjoy a relatively rich life in later life and there is no need to stay at home and live a good life [4].

2.1.3. Relevant Laws Are Very Sound. He was a pioneer in protecting the rights of the elderly and was the first Frenchman to support his parents. In 1944, the government passed several laws to support parents and established strict work evaluation and supervision. All indicators have certain quantitative rules, which can avoid subjective intolerance. The establishment of the Standardization Council for the Elderly Elderly emphasizes not only professional pension laws but also the standardization of pension services. To ensure the quality of geriatric care, Singapore has enacted a series of standardized laws such as the Geriatric Care Regulations and the Geriatric Care Regulations. Thus, the assessment and monitoring of urban Yoro services can be based on criteria that support the quality of services and effective monitoring.

2.2. Aging of the Pension Service System and Incompatibility to the Social Status Quo. In 2018, the following comments were made: "good leisure agriculture, rural tourism projects, and opinions on building a reasonable form of industry." Further emphasis on the overall direction of pension development and rural development. China is experiencing a serious wave of aging, and the number of older people is growing at an unprecedented rate. Existing pension organizations cannot meet people's actual expectations about the quantity and quality of noodles [5]. The disadvantages of the traditional pension model are becoming increasingly obvious. With the significant improvement of people's living standards, the healthy and ecological pension model is an important trend in the development of the pension industry and also the desire of the elderly. Due to the above-given social development background, some natural and ecological resources in excellent rural areas provide more development opportunities. It makes full use of its unique ecological resources, develops the ecological criticism industry, and combines the ecological agriculture with the organic agriculture. The industry serves as a leisure tourism, as shown in Figure 2.

In order to promote the rapid development of the rural economy and the rapid realization of rural development, the literature research integrating ecological luo industry with rural development can provide a reference for the research in related fields. Local governments actively promote the nonprofit pension model, and they also encounter many problems and challenges in the process of development, as shown in Table 4. In particular, the imbalance and shortage of pension benefits, unbalanced resource allocation, and regional differences are significant. The imbalance and inadequacy of the development of residential procurement

TABLE 1: Distribution of typical cases of the rural elderly care service innovation mode nationwide.

Area	Province	Amount	Typical case example
East	Hebei province	4	
	Jilin, Guangdong, Hainan, Tianjin	1	
	Heilongjiang province and Liaoning provinces	3	Harbin Pingfang district government and social cooperative "1 + 4" rural mutual assistance pension model
	Jiangsu province and Shandong province	10	Jiangsu Donghai block "three care in one" rural pension model
	Fujian province	22	Quanzhou city, Fujian province, has the "free lunch" platform
	Zhejiang province	6	Zhejiang Tonglu County "home courtyard body micropension institutions construction
	Shanghai municipality	2	
	Beijing municipality	5	
	Anhui province and Hubei province	7	
	Jiangxi province	3	Anhui Shucheng County "one network two raise three services" model
Central section	Henan province	4	Henan Nanyang city extremely poor personnel "four concentration" model
	Hunan province	2	Hunan Shimen County home care service chain operation model
	Shanxi international gong and drum festival	1	
	Chongqing municipality, Yunnan province, Ningxia Hui Autonomous Region, Qinghai province, Gansu province	1	Guangxi Qinzhou city rural "house for pension" model
	Guizhou province, Inner Mongolia autonomous region, Shaanxi province	3	
West	Sichuan province, the New Phrenm Uygur Autonomous region	4	Kunming city, Yunnan rural "to dance old" model
	The Guangxi Zhuang autonomous region	2	Guizhou Tongren city "five type" rural mutual aid happiness hospital
			Sichuan Luzhou Pension Mutual Aid Association model
Amount	Thirty provincial administrative regions	H7	

violate the property of public goods, namely, "benefit sharing" and "fair and reasonable." This is consistent with this point in the 19th report. The National Congress of the Communist Party of China put forward the goal of balancing basic public services in principle [6].

2.3. Based on the Ecological Environment-Friendly Elderly Care Service Community

2.3.1. Eco-Environment-Friendly Community-Based Elderly Care Services. The suburban model of the suburban ecological pastoral area is developed, and the power of the state, business, society, and individual are integrated, and the suburban resources are integrated. We should pay more attention to pension issues. At the same time, the gradual deepening of population aging and the personalized demand for the elderly have brought new difficulties and challenges to the development of China's pension insurance industry. With the strong support of national policies, in order to reduce the burden of the government, help the elderly, and comfort the children, the ecological rural pension industry has carried out test points nationwide, laying a solid foundation for the further development of the pension industry [7].

2.3.2. The Advantages of Ecological Environment-Friendly Elderly Care Service in the Community. As people's living standards improve, participation in leisure activities (such as abundant crop cultivation and excursions) increases, especially the holidays contributing to the development of the rural Jro model. We have built an ecological industrial chain model in diversified urban and rural areas, reducing the impact of seasonal changes on the industrial development process of the industry, emphasizing its advantages, and gradually becoming the current ideal social development model.

3. Methodology

For the age, environment, facilities, and space problems brought about by the operation of the pension model, the state, individuals, and enterprises have carried out in-depth research on the pension problems. In order to promote the rapid construction of scientific and efficient elderly care facilities, the elderly care services can be gradually improved according to the relevant national policies. We constructed an ecological orro model to combine the dominance of industrial space with the master planning [8].

TABLE 2: Comparison of the three major pillars of pension in China, the United States, and the Netherlands.

Essential information	Classify	Sample number	Proportion (%)
Age	60–69	675	46.1
	70–79	485	33.1
	80 years old and older	305	20.8
Sex	Man	613	41.8
	Woman	852	58.2
Degree of education	The terminally ill	394	26.9
	Primary school and junior high school	739	50.5
	High school and above	331	22.6
Domicile	City	695	47.4
	Rural area	770	52.6
The resident manner	Live with your children	896	61.2
	Do not live with your children	569	38.8
Marital status	Have a spouse	1095	74.7
	Mateless	370	25.3
Level of income	Low income	550	34.5
	Middle income	474	32.4
	High income	486	33.2
The body is frozen	n texture	1267	86.5
	Semi-incompetence	122	8.3
Operative mode	Disability	76	5.2
	Retire	1265	86.3
	Endure	200	13.7
Communicate with your children	Frequent communication	545	37.1
	Not often communicate	920	62.9

TABLE 3: Comparison of the three major pillars of pension in China, the United States, and the Netherlands.

Pension assets comparison		The first pillar	The second pillar	The third pillar	Total
China (2019)	Scale (US $1.00 trillion)	1.29	0.40	0.11	1.80
	(%) in the proportion of GDP	9.03	2.82	0.74	12.59
America (2019)	Scale (US $1.00 trillion)	2.72	17.32	12.16	32.20
	For/% of GDP	12.71	80.83	56.76	150.30
Holland (2018)	Scale (US $1.00 trillion)	0.38	0.95	0.57	1.90
	(%) in the proportion of GDP	43.20	108.00	65.30	216.50
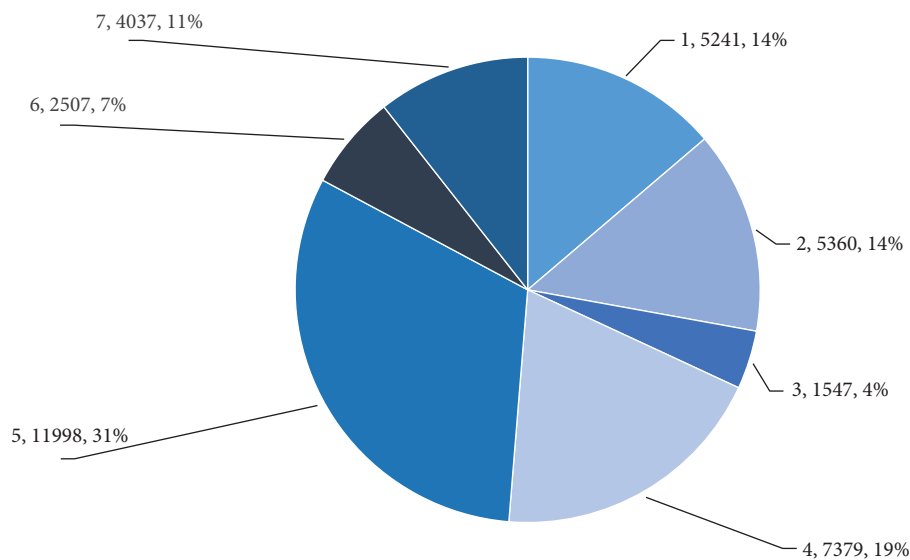
FIGURE 1: Number of aged care institutions.
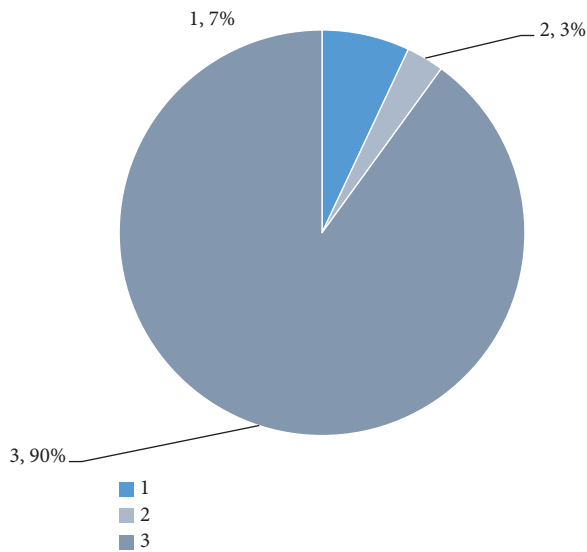
Figure 2: Structure of China's retirement industry.

3.1. The Realization of Eco-Environment-Friendly Elderly Care Services. We explore the ecological teachings and characteristics of the suburb as a rural ecological frontier. In recent years, the gap in urban development is not only material but also cultural. We should balance the cultural and material differences between urban and rural areas, create a good interactive model, organically integrate local industries, and develop new suburban and rural ecological support. This development not only reflects the whole noodle development of the new company but also reflects people's yearning for a better life in [9].

3.1.1. Design of Community-Based Living Space for Elderly Care Services. Housing design of rural ecosystems plays an important role in the development of pension models, as shown in Table 5. Due to the poor health status of the elderly, the space for social activities gradually shrinks, and the elderly's dependence on and demand for housing gradually increases. Therefore, the design of a rural ecological nursing home is particularly important. In the design of the living space, the housing of the elderly should be close to the ground, and there should be low residential buildings and small high-grade buildings so that the elderly can choose [10] according to their own family conditions and preferences. Room types were also designed for one and multiple rooms. The Housing feature allows you to receive smart services integrated with a nursing home. Living space mainly includes bedroom, kitchen, toilet, and balcony; it is important to have a living room. To avoid cloudy, snowy, rainy weather, and to reduce recreational activities for older people, elderly people tables, chess boards, television, and movies were installed. In addition, the room, kitchen, bathroom, and balcony in the room design should consider the problems of the elderly, such as slow limb movement and inconvenience. In addition, alarm systems must be installed to ensure the safety of the elderly.

3.1.2. Community-Based Outdoor Space Design for Elderly Care Services. The rural elderly environment includes both the indoor environment and the outdoor environment. To provide a quiet and comfortable outdoor environment for the elderly, you will need to design a green outdoor environment and combine it with a natural ecology. In the outdoor road design of eco-villages, it is necessary to link the outdoor activity areas of the elderly with the convenience of the elderly. Rural pension organizations can organize vehicle associations. The ambulance and fire station were installed to connect the elderly road of the village with the city road to avoid road problems and wasting time [11]. Rural elderly care systems should reduce the use of foreign vehicles and domestic vehicles and prevent exhaust pollution from affecting the quality of the elderly. The primary purpose of rural care is to provide a quality living and rest environment for the elderly. As a new Jolo model, we must attach importance to environmental construction. In addition to planting cherry trees and trees, we must also invest in lakes to bring the elderly closer to nature and provide a place for discussion and games to enrich their future lives. Finally, we established a public cultural institution such as the reading room, library, and computer learning center.

3.2. Ecological and Environment-Friendly Old-Age Care Model Service Process. How does the new pension model meet the individual needs of different elderly people? This is the direction that every government and NGOs are looking for. In recent years, the combination of medical treatment and nursing care, the concept of intelligent pension, and the emergence of this model have opened up new development goals for the pension business. With the support of the state and municipal governments, the rural pension model is being gradually improved. The Internet, the Internet of Things, and other technologies are combined to create a more scientific and effective space for the elderly.

3.2.1. Service Mode of Combining Medical Care and Nursing Care. The medical service model combines online and offline services to meet the needs of modern elderly health and care services. With the support of national and local policies, it is possible to achieve people's satisfaction and social welfare through social awareness. In the suburbs, communities use information technology, and health and medical information for the elderly is combined with a modern smart hospital [12]. Hospitals can develop detailed treatment plans, medical care, rehabilitation, and health care services according to the health status of the elderly and can promote the "medical bond" for the elderly, as shown in Figure 3. At the same time, rural pension organizations can customize smart bracelets for the elderly to monitor the health conditions in real time, greatly reducing the probability of accidents.

3.2.2. "Nongjiale" Tourism Service Mode. With the rapid economic development, the elderly have placed more and more emphasis on spiritual enjoyment. Sunset ecological

TABLE 4: Index system of equalization of community services for home care.

Level 1 indicators	Secondary indicators	Level 3 indicators	Level 3 indicators	The final weight
Accessibility to home care community services	Starting point (1/3)	Availability (1)	Number of community network service personnel addresses (1/6)	1/18
			Number of sites of community network service facilities (1/6)	1/18
			Type of community point service content (1/6)	1/18
			Community door-to-door service personnel count qi (1/6)	1/18
			Community door-to-door service content rush (1/6)	1/18
			Community door-to-door service content rush (1/6)	1/18
		Accessibility (1/3)	Distance from home to community service outlets (1/4)	1/36
			Access to community service point (1/4)	1/36
			Cost from home to community services outlets (1/4)	1736
			Waiting time for on-site service by appointment service personnel (1/4)	1/36
	Process (1/3)	Affordable (1/3)	Price affordability for community life care services (1/5)	1/45
			Price for community medical care services "I burden (1/5)	1/45
			Price Affordable (1/5)	1/45
			Price Affordable services for Xuxu (1/5)	1/45
			Extra burden (1/5)	i/45
		Acceptability (1/3)	Acceptance of the local environment of the community outlets (1/4)	1/36
			Acceptance of community network services (1/4)	1/36
			Community service reservation system availability (1/4)	1/36
			Acceptance of community door-to-door community services (1/4)	1/36
	Result (1/3)	Adaptable (1/3)	Life care services to the community (1/4)	1/12
			Degree of medical care services to the community (1/4)	1/12
			Degree of cultural and entertainment services to the community (1/4)	1/12
			Spiritual comfort services to the community (1/4)	1/12

leisure industry, especially leisure tourism is a household name. The rural Yoro ecological model is a cultural display place based on the local historical and cultural construction. Through the interpretation of the traditional Chinese culture, we can inherit the history and culture. Combine the development of the local leisure industry with the characteristic economic industry, to form the local characteristic tourism mode, promote the development of the local economy, and reflect the overall service of the industry.

3.2.3. "Farmhouse Music" Catering Service Mode. The construction of the pension model provides a full range of services for the diet and seats of the elderly, adapts to the special dietary materials, meets the needs of the postpartum taste of the elderly, and provides the quality of life for the elderly. An inconvenient old man can order food through a smart machine and taste delicious food, and you do not have to go to a designated location [13].

3.2.4. Education Service Mode for the Elderly. In the process of developing the education model for the elderly, pension organizations can interact with local universities. The regular selection of teachers and students for education and communication not only inherits the spirit of "learning for the elderly" but also increases the enthusiasm of teachers and students to participate in community service activities [14]. Under the guidance of professional knowledge, the rural pension ecological model not only promotes the improvement of the quality of pension but also promotes the innovative development of pension facilities [15].

4. Result Analysis and Discussion

4.1. Obtained by the Ecological and Environment-Friendly Elderly Care Service Community Merits and Drawbacks: Merits and Faults. As shown in Figure 4, establishing the rural ecological Joloy model can design the planning mechanism for the reemployment of the rural elderly people.

TABLE 5: Rural ecological pension evaluation index system.

Target layer	Criterion layer R	Index layer C
Ecological pension	Country nature	Air quality condition C11 vegetation coverage condition C12
	Surround ratio	Tourist attraction conditions C13
	Rural foundation	Distance condition from the city of residence condition C14
		Road traffic facilities: C15
		Country Lighting facilities C16
	Facility R2	Network communication facilities C17 hydropower and heating supporting facilities C18
		Sewage treatment facility C19 accommodation conditions C110 diet conditions cm
Evaluation system	Rural pension	Fitness and recreation and leisure conditions C112
	Condition R3	Medical condition C113 quality of care condition C114
		Service price conditions C115
		Harmony degree of villagers C116
	Rural pension	Financial subsidy policy for investment in pension facilities: C117
		Water, electricity and heating cost subsidy policy C118
		Tax relief policy C119
	Policy R4	Financial support policy C120
		Social capital support policy C121 construction land approval policy C122
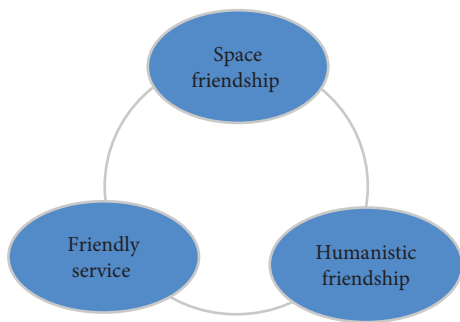
FIGURE 3: Three dimensions of building a friendly community for the elderly.

These jobs are mainly suitable for older people engaged in professional and nonprofit businesses. They provide the elderly and dynamic people with the opportunity to realize their own value [16]. At the same time, the elderly can use this method to use the waste heat, which is not only conducive to sports but also conducive to the development of the country.

The choice of an ecological model of the pension industry is one of the frontier problems of industrial economic theory research. Carrying out the revitalization work of agriculture, rural areas, and farmers is an important part of the theoretical research of its development. The scientific path of ecological luo industry integration and rural development are concentrated in four aspects. First, we emphasize the interaction, networking, interactivity, and reciprocity of urban and rural communities in the process of rural construction. Mutual benefit and win-win situation of urban and rural residents are promoting the development of rural areas and is regarded as an important condition for sustainable development [17]. Secondly, the service level of rural farmland is generally low, which is quite different from the actual service demand of the modern elderly. Finally, extreme phenomena appear in the process of development and utilization, the public environmental awareness is weak, and the problem of rural environmental pollution is increasingly prominent. The green pension industry is a new form of industry in China, and the rural promotion strategy has been put forward in recent years. Research by local scientists is very limited and is still in the first stage. Although these research puzzles have some reference value to the development of scientists, the concept of the ecological cleaning industry has not been unified. The index system of ancestral industry and rural promotion is not yet clear [18]. Studies on rural areas in economically underdeveloped areas rarely emphasize the concept of industrial symbiosis, but few studies on industrial symbiosis, as shown in Figure 5.

4.2. Revelation

4.2.1. Introduce Multiple Subjects and Broaden Investment Channels. In the pension industry, we can not only maintain the sustainable and healthy development of the industry through the power of the government but also introduce social service organizations, companies, and volunteers by integrating social forces. Introducing social groups can strengthen the ability to organize activities and lay the foundation for more social work. The introduction of the company has played an important role in expanding the funding sources, not only reducing the financial pressure of the government but also expanding the company's business, creating a win-win situation [19]. The participation of volunteers will help to create a harmonious atmosphere of social and cultural exchanges and save more funds for infrastructure construction. Based on the Singapore experience, associations, religious organizations and businesses have played a major role in caring for older people. Therefore, we must also play the positive role of all social groups to promote the development of the pension industry.

4.2.2. We Will Accelerate the Formulation of Laws, Regulations, and Standards for Community-Based Eco-Friendly Elderly Care Services. Strengthening the establishment and improvement of relevant laws and regulations, as well as the formulation of industry standards, is crucial for the long-term development of community pension in China. Article
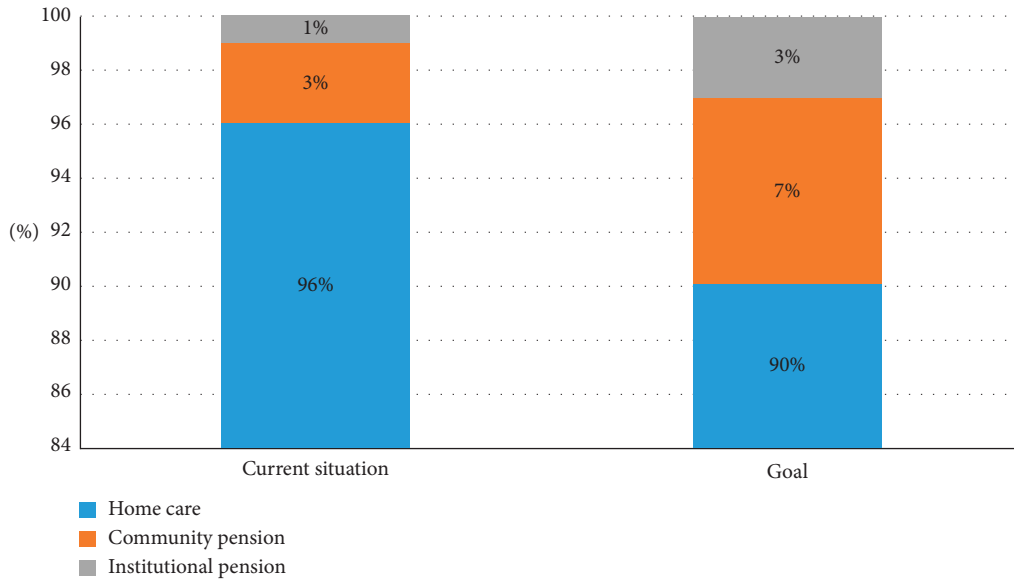
FIGURE 4: The development of the structure of China's pension model.
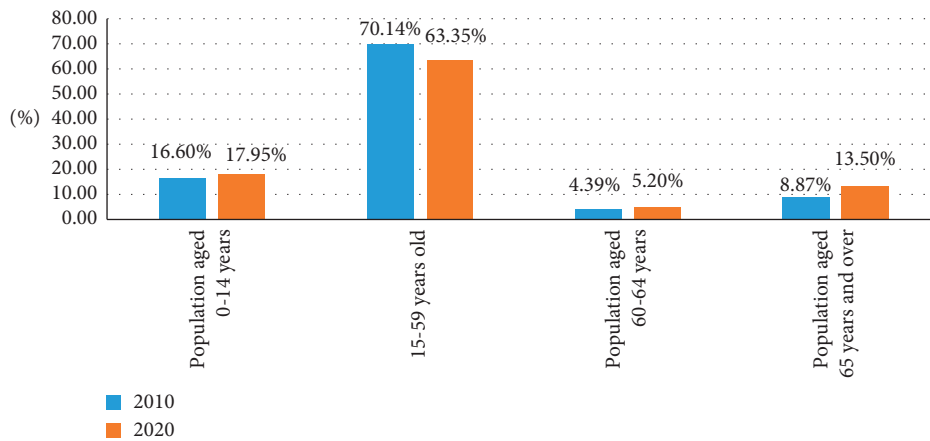
FIGURE 5: Date on the elderly population.
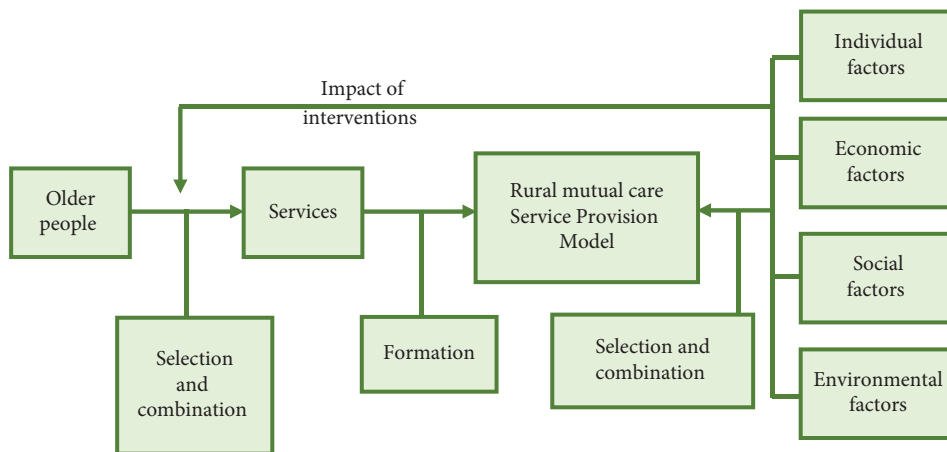
FIGURE 6: Analysis framework.

35 of the Law of the People's Republic of China on the Protection of the Rights and Interests of the Elderly stipulates: "develop community services and gradually establish service facilities and networks to meet the needs of the elderly, such as life services, cultural and physical activities, health care, and rehabilitation" but does not explain what and how to do it. According to China's current level of economic development, the unique culture and needs of the elderly, the current situation of the community pension, the responsibility division of the participants in the community pension, the fund source and use of the community pension, Design of the appropriate institutional arrangements clarify the types of community pension institutions, the content, methods and service quality of community pension services, and the working standards of community pension staff; the access and exit mechanism of third-party participation and the content and standards of volunteers' participation in elderly care services have clear and specific provisions on all aspects of urban elderly care services. The healthy, orderly, and rapid development of China's urban old-age service industry cannot be separated from the common role of all aspects[20].

As shown in Figure 6, strengthening the establishment and improvement of relevant laws and regulations and establishing industry standards are the key to the long-term development of community communication in China. According to Article 35 of the People's Law of China on the Protection of the Rights of the People's Republic of China, "it is not clear whether to develop community services for the elderly, to establish services and networks for life services, cultural and sports activities, health and rehabilitation, and what to do and what to do." According to China's current level of economic development, the unique culture and needs of the elderly, the status of the children in the community, the occupational labor resettlement of each community pension participant, the source and use of the community children fund, the design of the appropriate level arrangement, and the type of the community future fund are clearly defined. Content and conditions of community pension organizations. Community proposition service mode and quality, community pension work standards, the participation and withdrawal mechanism of third parties, and the participation and standard of volunteer service to elderly care service are clear and specific for each side of urban elderly care service, which promotes the healthy development of urban elderly care service. The rapidly developing city and Jro service industry have become an important road for the development of the elderly [21].

4.2.3. Increasing Investment in Infrastructure Construction. Developing family nurseries needs government support. Western countries are very concerned about the investment and construction of pension infrastructure in developing communities. However, around this week, there are many Chinese communities in the area, such as the Urban Health Center, the Masters, the Super Marquette, and other housing services. There were fitness facilities for all community residents, but few facilities specialized in senior activities at

the start of construction. China has a large population and many communities, so all the communities directly facing huge financial pressure need substantial financial support to provide pension facilities. Thus, we were able to invest in nursing homes in a larger community and are gradually promoting them across the country [22].

5. Conclusion

In recent years, the community of ecological environment-friendly elderly care service has increasingly become the mainstream of elderly care production, and the state strongly supports the development of the elderly care service community. The community can not only let the elderly enjoy the warmth of home but also enjoy the natural ecology and nature, and their children do not have to give up their work to take care of the elderly.

This paper discusses the policy to promote the opening of the sunset farm pension model. The construction of this model has greatly promoted the socio-economic development and improved the quality of life of the elderly. At the same time, due to the joint participation of the society, enterprises, the state, and individuals, the ecological parenting industry has great development potential, which can not only meet the psychological and physiological needs of the elderly but also promote the development and innovation of the ecological parenting industry.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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Hindawi

Retraction

Retracted: Promotion and Protection of Feminism Creativity for Public Environment: The Integration of Ecofeminism and Public Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] W. Dong and S. Kim, "Promotion and Protection of Feminism Creativity for Public Environment: The Integration of Ecofeminism and Public Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 5706699, 7 pages, 2022.

Research Article

Promotion and Protection of Feminism Creativity for Public Environment: The Integration of Ecofeminism and Public Environment

Wanjin Dong [iD] [1,2] **and Soonbae Kim** [iD] [2]

[1]*Nanyang Medical College, Nanyang 473000, China*
[2]*Chungbuk National University, Chungbuk 28644, Republic of Korea*

Correspondence should be addressed to Soonbae Kim; pearlpoet@chungbuk.ac.kr

Each of us leaves a trace of our consumption on the environment. Take a step back, though, and consider how much influence people have had on the Earth. The Anthropocene, sometimes known as the era of humans, refers to how significantly we have changed the Earth's systems. This is the grand view of humanity's impact on the Earth. In this article, we plan to introduce and explain ecofeminism. Because of the natural connection with nature and the social role as housekeepers, women often have empathetic power when expressing their demands for the public environment, thus becoming a vital force in public environmental protection. Facing the public environmental forces spurting from ecofeminism, we study the dissemination of ecofeminism with the help of mass media. However, in present-day China, as pointed out by ecofeminism, the predatory exploitation of nature and the catastrophic killing of plants and animals make the fate of women challenging to control. Therefore, we study the theory of multicultural ecofeminism and public environmental protection. Finally, based on the integration of ecofeminism and the public environment, we interpret Lawrence's famous work, Sons and Lovers, and analyze the relationship between men and women and the public environment in this work from the perspective of ecofeminism. In human socialization, ecofeminism has provided strong support for protecting the public environment, and at the same time, it has also improved.

1. Introduction

In the 1970s, ecofeminism emerged with the environmental movement in Western society and developed rapidly in the West. Ecofeminism maintains that the question of "nature" and "woman" is naturally related. Its core argument is that there is a historical isomorphism between "belittling nature" and "belittling women" [1, 2]. The reason why ecofeminists pay attention to "nature" is that they try to construct a new relationship between man and nature by analyzing the root of the contradiction between man and nature, so as to realize the liberation of nature and women [3]. Certainly, ecofeminists try to overcome the ecological crisis faced by mankind with the restoration of "female principles." The emergence of ecofeminism has led to a green revolution [4–6]. It reveals the connections between the myriad forms of oppression rooted in man's efforts to control nature, especially the oppression of women. To eliminate the inequality imposed on women by the patriarchal society, it struggles to give women the same free and equal social power as men. It strives to realize the cooperation and joint development between men and women. The essence of ecofeminism points to the protection of harmonious cultural ecology and cultural environment. Its activists strive for equality between men and women in the sense of cultural ecology and environmental protection. They not only achieve equality in social status and human rights but also realize women's reasonable status and legal rights in personality and culture.

Like other feminists, ecofeminism strives for the equality and harmonious development of men and women in society. In 1974, Françoise d'Eaubonne first used ecofeminism and

revealed that the oppression of women by patriarchy was directly related to the oppression of nature, including historical, empirical, symbolic, and theoretical connections, which led to an ecological and environmental humanistic revolution [7–10]. In ecofeminism, as shown in Figure 1, the prefix eco comes from ecology or the study of living organisms and their environment, and feminism in its basic sense relates to the advocacy for gender equality in women's rights. Ecofeminists have sharply criticized and sought to subvert the patriarchy that caused these oppressions and the erroneous concept of duality between nature and culture, pointing out that it is a feature of patriarchal society. They extend the inequality of hierarchy between men and women to the separation of culture and nature and the difference of opposing hierarchies. Patriarchy, just like the oppression and coercion of women, starts to plunder and control nature to show the superiority and hegemony of patriarchy.

Ecofeminism is richer than any other branch of feminism in that it strives to expose the connections between the myriad forms of oppression rooted in man's efforts to control nature. Ecofeminism is also a decisive understanding of feminism and environmental ethics [11–15]. It discovers the tragic reality of the patriarchal misconception that separates animals from humans, men, and women. There are many branches of ecofeminism, which can be divided into two types: the ecofeminism of social constructionism and the ecofeminism of naturalism. The so-called ecofeminists of social constructivism regard the connection between women and nature, men and social culture as their subordination to women (or women to men) and human predation of nature. They believe this idea of patriarchy is so powerful that women, like men, believe that women belong only to the private sector, where they use their hands and thoughts to raise their children. While men belong to the public domain, where productive and creative work takes place; men use their machines and computers to build society. For feminists of social constructivism, the position taken by some challenges the idea that women are detached from the limited connection between nature and reproduction, that there is absolutely no idea that nature is inferior to culture, or that reproduction is less valuable than production. The special qualities of women stem from their biological connection to the reproduction process of nature, not from the denial of their connection to nature. Women should unwaveringly adhere to nature rather than culture. Reproduction, not production, is an absolute necessity for life [16–19]. Ecofeminism believes that women tend to value relationships and special individuals because of their nature and female experience. They emphasize care, nurturing, and affection, and they strive to reset conflicting and individual claims in a cooperative and communal way.

The theoretical and practical significance of ecofeminism lies in the following: First, it tries to end the sexist oppression and discrimination against women and nature. Androcentrism includes any concept that controls the dominance or subordination of women, which results in the existence of oppression of sexist. Additionally, sexist bias exists in language as well as in many other fields, including employment, education, and so on, and the erroneous thoughts and realities
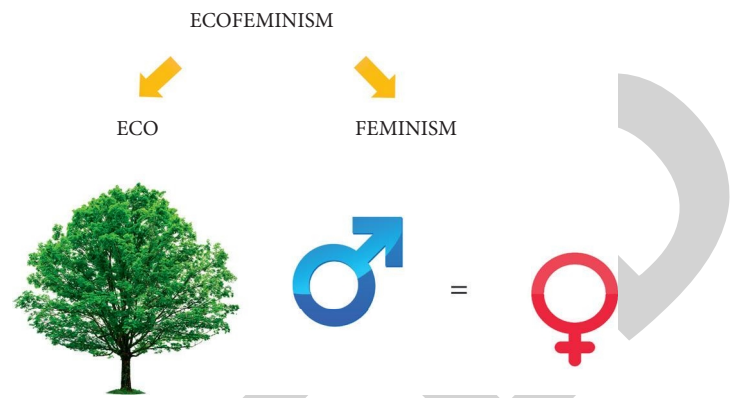
Figure 1: Schematic diagram of ecofeminism.

that separate and oppose men from women, nature, and culture must be completely eliminated. Second, ecofeminism tries to safeguard the potential of women. It further points out the patriarchy's discrimination against nature, biology, and women, which separates and antagonizes them from the human social culture-men. Third, ecofeminism strives to eliminate such inequality and unreasonable reality, strives for social and cultural power, and creates equal and harmonious relations and culture. In essence, it is a cultural, ecological public environment protection theory. The contributions of this study are summarized as follows:

(1) Facing the public environmental forces spurting from ecofeminism, we study the dissemination of ecofeminism with the help of mass media

(2) We study the theory of multicultural ecofeminism public environmental protection

(3) Based on the integration of ecofeminism and public environment, we interpret Lawrence's famous work, Sons and Lovers, and analyze the relationship between men, women, and public environment in this work from the perspective of ecofeminism

The rest of the article is organized as follows. In Section 2, the ecofeminist movement and dissemination of ideological trend helped by mass media is studied. Section 3 studies multicultural ecofeminist public environmental protection. In Section 4, the ecofeminism in Sons and Lovers is interpreted. Section 5 concludes this article.

2. Ecofeminist Movement and Dissemination of Ideological Trend Helped by Mass Media

Before the formation of social movements, women had already been deeply involved in the field of public environment due to ontological experiences and concern for family life [20–25]. In the 1960s, in the United States, women started their own environmental activism to address the health and public environment problems they and their families faced. At the beginning, faced with the cruel behavior of human beings, especially men, who randomly hurt animals in the name of developing science and technology, women instinctively linked the fate of animals with their

own fate and called for the protection of animals' survival rights. Afterwards, women's concerns about the public environment directly prompted their participation in urban environmental reform activities. During this period, most of the women tended to achieve environmental protection through political channels. They were committed to promoting environmental laws and administrative orders to ensure healthy public environment for their families. Out of maternal concern for the public environment and concern for family life, women instinctively raised their voices for improving the public environment by conducting investigations, making speeches and seeking the help of government departments by making use of their influence, mobilizing the participation of public people in improving public environment from an individual perspective, and eventually pushing for government environmental policy and laws. These kinds of women's conscious behaviors directly popularized and spread the concept and knowledge of protecting urban health. Using gender as a vantage point, ecofeminism examines the conditions that cause and perpetuate the subordination of both women and nature. It can be thought of as a lens for examining intersections of oppression; harmful practices that exploit the environment and social structures that oppress women among other groups have an overlap, and that is what ecofeminism is all about, as shown in Figure 2.

Women's protection of the public environment shows their close connection with nature and strengthens their social role as "family caregivers," but at the same time, they are satirized and attacked by the patriarchal civilization. They believe that these women's environmental behavior is purely out of personal emotions and concern for their individual lives, lacking rationality and technology, and lacking sublime and applicability [26–28]. In the face of all kinds of criticism and scrutiny, female public environmental protection activists with ecofeminist consciousness began to realize that women's marginal status is the main reason behind men despising and belittling women's environmental protection behavior. In a male-centered patriarchal society, women's true meaning and value are diminished or even totally denied. They are imprisoned in the private sphere of family life for a long time, unable to participate in the discussion and decision-making of public affairs, and eventually become victims of male activities just like nature. Therefore, ecofeminism gradually shows a strong color of publicity, which emphasizes that women must act against the oppression of patriarchal social culture, change their position, seek equal social status and speech rights with men, and then gain a place in the public sphere. As there is a natural affinity between women and nature, public environmental problems can link family life and public society. Hence, ecofeminists consciously take the intervention of environmental issues as an important way for women to resist male chauvinism and compete for public power.

At the same time, as the disadvantages of industrial civilization become more and more obvious and the development of mass media becomes more and more mature, environmental problems begin to gain more attention in the mass media. Media disseminates and reports environmental

Public Environmental Exploitation

Gender Oppression
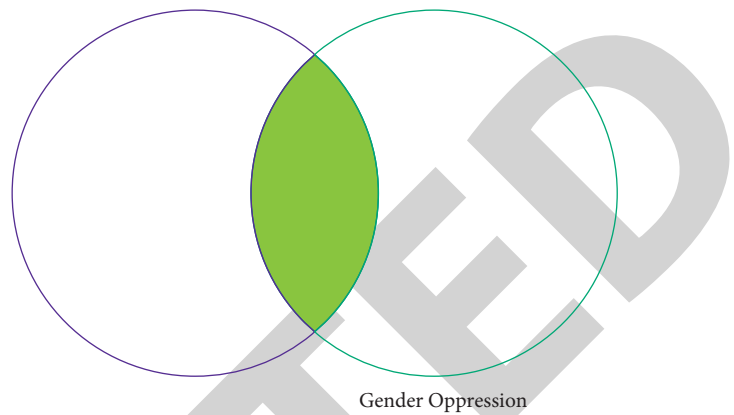
Figure 2: Whole context for ecofeminism.

events and information in a popular way, widely popularizing the concept of environmental protection. They purposefully stimulate and guide public sentiment and public opinion, thus influencing the progress of environmental events and environmental movement. Under the influence of mass media, social resources have been highly mobilized and integrated, and civil environmental protection forces have effectively united and entered the environmental movement, thus forming a wave of social movement, which has a crucial impact on the formulation of government public environmental policies and the implementation of environmental protection measures.

Aware of the media's communication advantages, ecofeminists began to actively use the mass media to expand their influence. They consciously seized the media's right of speech, sought resource mobilization and support nationwide, and infected other classes and groups of society with a positive attitude to protect the environment, resulting in universal linkage and imitation of social effects. In this process, driven by some women scholars and sportsmen, the expression of ecofeminism has become more and more mature, and the perspective of ecofeminism has begun to become familiar to ordinary people through the mass media, and is gradually becoming known to the public through the mass media.

For ecofeminists, the public environment communication activities carried out by means of mass communication finally expanded the activities with self-liberation significance to a broader public stage. With the reports and propaganda of mass media, women show advanced environmental concepts, keen perception, and strong environmental protection power in the field of social life, which also makes the movement of women outside the private field prominent enough to be recognized by the public [29, 30]. At the same time, the success of these campaigns has also accumulated experience for women public environmentalists in developing feminist ecology. This is because women's involvement in public environmental issues, on the one hand, enhances and amplifies their advantages and abilities in perceiving environmental hazards and achieves the initial goal of public environmental protection. On the other hand,

it is also an essential way for women to participate in the public sphere and compete with the male-centered social structure and institutional culture.

In all kinds of public environment communication activities developed through the mass media, women have actually experienced a tremendous change in environmental perspective and motivation. From the very beginning, they only concerned themselves and their families' living environment, and then actively helped other people in society to solve the public environmental problems. In this process, women are no longer trapped in their private lives, but become important participants in the public sphere and have a significant impact on social development. The success of this activity also confirms the core concept of feminist ecology, that is, women construct a way to resist the gender oppression of patriarchal society in their campaign to protect the public environment.

Driven and motivated by mass media and women, more and more ordinary people begin to pay attention to public health and public environment and try to participate in the process of public environment. With the continuous exposure and development of mass media, the resources and forces of environmental protection in society have been highly mobilized and integrated to the maximum extent, thus forming a wave of social movement. Ecofeminism and public environmental communication gradually break through the limitations of groups and go to the public arena, becoming a common topic in the public field. At this time, the social movement initiated by the women's public environmental protection movement and other groups resisting the oppression of social system began to have a theoretical and practical connection, and the feminist ecological trend of thought was ready to give theoretical support to the public environmental justice movement.

Originally, the patriarchal society oppressed not only women and nature, but also vulnerable groups such as colored people and low-income people. Like women, they are also excluded from the public sphere, lack the corresponding science and technology and the opportunity to participate in public decision-making, and thus cannot enjoy equal environmental welfare and become victims of the public environmental crisis. In addition, when faced with environmental problems, the cries for help from other vulnerable groups like women are often not taken seriously. Ordinary people's accusations about chemical pollution or other public environmental problems are considered to be too emotional or ignorant. Their beliefs and voices expressed in public forums are often defined by government officials as unseemly or inappropriate.

3. Multicultural Ecofeminism Public Environmental Protection

In the process of China's rapid modernization, the status of women has witnessed a downward trend. Although they have participated in a lot of work, the status and role of women have not been recognized much, and women's employment and development are also faced with difficulties [31]. In present-day China, as ecofeminism points out, the fate of women has become challenging to master due to the predatory development of nature and the catastrophic slaughter of animals and plants. Therefore, we urgently need the rapid rise and development of ecofeminism and, more importantly, emphasize the essence and direction of ecological feminism, cultural ecology, and cultural environmental protection. Cultural ecology and environmental protection should not only overturn and adjust the binary opposition between men and women, but also between culture and nature and between spirit and body, and achieve integration and perfection through humanistic revolution.

In thousands of years of human history, patriarchy has dominated the power of human culture, vigorously excluded the status of women in culture, completely denied the role of women in cultural creation, and greatly persecuted the cultural ecological balance of human society. Ecofeminism reveals the correlation between nature's oppression and women's oppression, and indicates men's coerciveness and hegemonic status in social culture. This kind of cultural monopoly is the characteristic of patriarchy, which produces a series of patriarchal value systems and patriarchal social structures. Men are dominant and superior, while women are subordinate and inferior. The "three obedience and four virtues" of the Chinese feudal society denied the status and identity of women as social and cultural subjects, and only regarded women as a tool for bearing children and carrying on the family line, depending on men.

Ecofeminism is a multicultural ecological public environment protection theory, which points out the crisis and trap that human beings are facing in public environment [32]. Ecofeminism has made positive efforts in multiculturalism. It not only pays attention to women's human and cultural ecological public environment, but also emphasizes the cultural ecological environmental protection of women's spirit. There are three aspects of women's spiritual and cultural ecological protection. (1) the spirit of promotion, (2) paying attention to the cultivation of inner nature, and (3) having a conscious sense of regeneration. In essence, the combination of spiritual and social dimensions is a conscious act to protect the cultural ecological environment.

Harmonious cultural ecological environmental protection is a harmonious cooperative system of equal symbiosis formed by the internal and external elements and their interaction of the humanistic interactive system consciously realized through humanism. Cultural ecology is a world created for humans, more systematic than nature or conceptual natural ecology. It not only includes the transformation of people's ideological and moral quality, but also includes people's scientific and cultural quality. It has the tradition of thousands of years of historical and cultural accumulation, but also faces the impact of foreign culture, with the important task of cultural innovation.

4. Ecofeminist Interpretation of Sons and Lovers

4.1. Sons and Lovers Review. Author, poet, and essayist David Herbert Lawrence was born in England. His works are primarily based on his early experiences in

Nottinghamshire, which had a significant impact on his life. His work reflects modernity's and industrialization's dehumanizing effects. Lawrence had spent his entire life being concerned about human sexuality; emotional health; and relationships between men, women, and nature (public environment). His novels and short stories have been reprinted in huge numbers and translated into a variety of languages around the world. Sons and Lovers is still one of the most popular works among the readers [33].

Sons and Lovers, first published in 1913, is today regarded as Lawrence's early masterpiece and semiautobiographical novel. Furthermore, it is usually regarded as the first significant novel to depict the lives of English working-class people. It came ninth on a list of the 100 best novels in English of the 20th century by the Modern Library in 1999. According to Lawrence, the novel's goal is to depict the tragedy of all British kids of his generation. Chinese critics and scholars have used a variety of theoretical frameworks to understand Sons and Lovers, including postmodernism, Freudian psychoanalysis, archetypal criticism, ethical critique, and feminist criticism.

Sons and Lovers is examined from an ecofeminist viewpoint in this section. Public environment and women are intrinsically intertwined, according to ecofeminism, and patriarchy is their common source of domination. The most important contribution of ecofeminism is the recognition of various socioeconomic injustices and oppressions caused by patriarchal ideals.

With its descriptions of public environment, various female characters, and the disharmonious relationship between men and women, Lawrence convincingly conveys the permanent traumas of public environment, the suppressed helpless existence of women, and the associated sorrow of men in Sons and Lovers. Lawrence's statements are all reflective of his ecofeminist ideas and desire for peaceful and harmonious interactions between men and women, as well as people and the public environment. As a result, an ecofeminist reading of the text clarifies the book's complicated public environment and gender concerns.

4.2. The Ideal Relationship from the Perspective of Ecofeminism. There were many vivid depictions of public environments in Lawrence's childhood, which may be observed in his novel. Public environment was destroyed as a result of the Industrial Revolution. Lawrence began to condemn men's actions and called for preserving public environment after witnessing his beloved environment being destroyed. Lawrence was influenced by several women during his life. He admired them. However, women had no status during his age. Many women participated in women's movements to fight for their rights. Lawrence supported the women's movements after being influenced by his female acquaintances. In Sons and Lovers, Lawrence combined themes of environmental protection with issues of women's rights protection. Lawrence's concepts were in line with ecofeminism's principles, despite the fact that ecofeminism had not yet been proposed. His ecofeminist notion was portrayed by his views in the novel.

Lawrence attempted to awaken human beings' awareness of ecofeminism by depicting the oppression of women and environment, demonstrating the specific relationship between both. Lawrence described the ideal relationship between women and public environment as one of harmony, peace, and love, and he encouraged humans to create this kind of ideal relationship.

Men in Sons and Lovers desired to master public environment, but men's inner selves yearn for it as well. Patriarchy refers to the male-dominated framework of modern culture and political institutions. Women's rights are thought to be jeopardized by such arrangements. However, it has been noted that patriarchal systems of government do not benefit all men of all classes. The exploiters' desire for property outweighed their desire for a healthy environment. The working class had no choice but to take whatever came their way and labored to make a living.

Men and women should have common topics, and should communicate with each other. The status between them should be equal, not be oppressed. In addition, they should have harmonious sexual life and spiritual communication. Lawrence held the opinion that there was no need to yoke them with any bond at all. The only morality is to have man true to his manhood, woman to her womanhood, and let the relationship form by itself, in all honor. Therefore, the ideal relationship between man and woman should be that "both are equal, two in one complete." A couple should be equal and love each other, they should depend on each other, overcome the differences of culture background and the difficulties in life together, raise children together, and spend life together.

Throughout his life, Lawrence was concerned about the links between women and public environment, men and public environment, and women and men. He loved the environment. Public environment was well described in Sons and Lovers. However, the Industrial Revolution had an impact on his hometown. He saw the damaged landscapes and the vanishing woods. He was also witness to men-women confrontations. As a result, he pushed for the preservation of environment and the liberation of women. He maintained that public environment, men, and women should all live in harmony. This subsection will discuss the ideal relationships from the perspective of ecofeminism, as well as the origins of Lawrence's ideas.

Lawrence's enthusiasm for the environment was primarily influenced by his father, Arthur Lawrence, who was passionate about wildlife and knew a lot about it. He would occasionally bring flowers or animals home and tell his children their names. He would tell his children about the plants and animals when they went on a walk outside. Lawrence had a natural passion for the public environment since he was a youngster, due to his father's influence. The Chambers relocated to the Haggs Farm as teenagers, and Lawrence paid them regular visits. He was enamored by gardens, houses, trees, flowers, and the countryside.

Lawrence embraced certain feminist ideals as a result of female influence. These women's images served as models for the heroines in his novels. He was a strong supporter of women's rights movements. He did not like dominant

women who wanted to be in charge of everything. He advocated for women to have the same rights, position, and opportunities as males. On the other hand, he did not support women discriminating against men. In his opinion, men and women should depend on each other. Moreover, Lawrence hopes for a harmonious relationship filled with love among the three—men, women, and public environment.

Lawrence's views on the interactions between men and environment, as well as men and women, are ecofeminist. Ecofeminists believe that women and public environments have a direct relationship. The patriarchal culture, which holds women and public environment to be inferior to males, is the basis of the same oppressive condition. This system defends men's dominance and women's subjection to public environment. Thus men are the masters of all things, while women and public environment should obey the orders from men. The same oppression makes women and public environment unite together.

Ultimately, Sons and Lovers is a masterpiece in which Lawrence expresses his concern for men's, women's, and natural connections. Lawrence hopes to raise public awareness about the need of protecting environment and women. The current climate is peculiar, and the entire world is constantly threatened by global economic and ecological crises. Therefore, rereading Sons and Lovers from an ecofeminist viewpoint is extremely important. This novel inspires us to create a future in which men, women, and public environment all enjoy healthy and peaceful interactions. Thus, we can establish a nice public environment in this way.

5. Conclusion

Taking the isomorphism between nature and women as a logical starting point, ecofeminists have profoundly expounded that the root of ecological crisis is closely related to patriarchal culture. The emergence and meaning of ecofeminism are rights and promises, and its ultimate goal and ideal is to strive for the equality and harmonious development of men and women. Ecofeminism has a unique rational thinking and new insights, and its logical methodology is from heroic ethics to comprehensive ethics. As the pioneer of public environmental protection, women have made great contributions to the common liberation of public environment and women. As the practice pioneer of public environmental protection, women have made great contributions to the public environment and the common liberation of women. Public environmental protection affected by ecological feminism was initially a conscious individual mobilization behavior caused by worrying about family life. After entering the middle of the 20th century, under the sustained reporting, shaping, and mobilization of the foreign mass media, public environment protection began to gradually move to the public stage, connect with the issue of justice, promote a wave of social movement involving the whole people, and ultimately exceed the limits of the national framework. In the process of women's public environmental protection, their understanding of nature has undergone a transformation from "housekeeping" nature to ecological nature, reflecting their strong potential and power in public environmental protection. Women's involvement and participation in public environmental issues is their attempts and efforts to enter the public domain, resist patriarchy, and change social status. They show society a unique perspective to solve public environmental issues by respecting differences and diversity, which provides a new path for women to participate in public affairs and realize their own liberation, and also provides a way for countries around the world to deal with national and social issues.

Data Availability

All data used to support the findings of the study are included within this paper.

Conflicts of Interest

All authors declare that there are no conflicts of interest.

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Retraction

Retracted: Research on the Difference between Environmental Music Perception and Innovation Ability Based on EEG Data

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] N. Zhang, "Research on the Difference between Environmental Music Perception and Innovation Ability Based on EEG Data," *Journal of Environmental and Public Health*, vol. 2022, Article ID 9441697, 9 pages, 2022.

Research Article

Research on the Difference between Environmental Music Perception and Innovation Ability Based on EEG Data

Na Zhang (ID)

School of Education Science, Shanxi Normal University, Taiyuan 041009, China

Correspondence should be addressed to Na Zhang; 701016@sxnu.edu.cn

It is of great significance to practice and explore music creation for training creative talents. Perception includes feeling and perception, and feeling is a reflection of individual attributes of objective things directly acting on sensory organs. This paper mainly has a research on the difference between environmental music perception and innovation ability based on EEG data. First, this study performed noise reduction and artifact preprocessing of EEG signals generated by subjects with different levels of consciousness subjected to musical stimulation and then performed tensor decomposition to obtain the tensor component of EEG. The time-domain components of these tensor components were analyzed together with five musical features (fluctuation centroid, fluctuation entropy, pulse clarity, key clarity, and mode), EEG tensor components related to music characteristics were analyzed, the power spectrum and the distribution of responsive brain regions were analyzed, and finally, the differences in the processing of music characteristics by different levels of consciousness were explored.

1. Introduction

Brain processing of music is a hierarchical neural processing process that extracts the low-level features of sound and then abstracts the high-level musical structure [1]. In recent years, the relationship between music perception and consciousness has become one of the concerns in the field of cognitive science. The exploration of the relationship between music perception and consciousness is helpful to reveal the neural mechanism of human brain cognitive activities, and it is also of great significance to the clinical application of music therapy. Previous studies on music perception are based on the state of consciousness, such as using awake subjects' functional magnetic resonance imaging (fMRI), to study the brain regions activated by music [2] and utilizing event-related potential (ERP) to study the changes in ERP response in waveform and rhythm of music perception [3]. There are also studies on the mental activity of patients with clear consciousness and brain injury when listening to music [4]. With the introduction of the concepts of micro-consciousness state (MCS) and vegetative state (VS) as natural models of consciousness disorders, these two states

of consciousness provide a new model and research paradigm for exploring the relationship between music perception and consciousness. Previous studies on subjects in different states of consciousness who were subjected to sound stimulation showed that the electroencephalogram (EEG) features [5], mismatch negative waves (MMN) [6], and functional magnetic resonance responses [7] showed differences in cortical responses. In recent years, many novel research methods have emerged, including EEG signal processing methods and music informatics feature analysis methods, which provide a new perspective for exploring the relationship between music perception and consciousness. Cong et al. used tensor decomposition to extract multidimensional features of EEG signals when listening to music and verified the feasibility [8]. EEG signal is a mixture of a large number of neural signals superimposed, so before studying the relationship between musical features and EEG signal, we must first extract the neural activity components related to musical features from EEG. Tensor decomposition is a multidimensional blind source separation method, which decomposes EEG signals into multiple independent source components with multidimensional characteristics,

and each independent source component is an independent neural activity [9]. Compared with other blind source separation methods (such as independent component analysis), tensor decomposition can make use of mathematical model algorithm in multidimensional feature space to separate the collected mixed signals into various independent tensor components while retaining multidimensional features of signals, such as time domain, frequency domain, and spatial distribution [10–12]. Finally, by calculating the temporal correlation between components and music features, the neural activity related to music features is screened, and then the EEG components responding to music features are obtained. In addition, acoustic features (intensity, pitch, and timbre) were used to study musical features. In 2012, Alluri et al. proposed the concept of time-domain signal characteristics of music from the perspective of signal based on local melody and range characteristics of music, including fluctuation centroid, fluctuation entropy, pulse clarity, key clarity, and mode [13]. Alluri et al. combined these musical features to study the fMRI of the tested music and found that a large-scale brain activity involving cognitive, motor, and limbic circuits was activated when the brain processed these musical features [13]. This brings the study of music perception from the traditional acoustic paradigm to the level of signaling and provides a new perspective for the paradigm of brain mechanism of music processing. Based on the new technology of EEG signal analysis and the characteristics of music informatics (signal), this study carried out a research on the difference in music perception of different states of consciousness and revealed how the state of consciousness affects the brain's processing of music production. By designing music stimulation experiments, collecting relevant brain telegrams, and using hierarchical alternating least squares (HALS) nonnegative CP tensor decomposition algorithm, dissociate music-related tensor components from collected EEG. Finally, the ratio power spectrum analysis and spatial distribution analysis of each EEG tensor component were performed to understand the influence of different levels of consciousness on brain processing music characteristics.

2. EEG Acquisition Method

2.1. Selection of Experiment Subjects. In this study, the EEG signals of the subjects in the microconscious state group and the vegetative state group were collected from Hangzhou Mingzhou Brain Health Rehabilitation Hospital and Hangzhou Hospital of Zhejiang Armed Police Corps. None of the selected subjects needed intubation and ventilator-assisted breathing, and they had no history of cardiopulmonary resuscitation or mental illness. In addition, in order to ensure the stability of the subjects' consciousness state and the consistency of EEG characteristics during the study, subjects who were in the microconsciousness state or vegetative state for more than one month and in the chronic stage were selected [14]. At the same time, the following case characteristics were excluded: patients with moderate or higher hearing loss, patients with locked-in syndrome, and patients with diseases that may lead to neuropathic deficits

in the brain. In the evaluation of consciousness level in this study, the CRS-R scale, which is effective in the international classification of microconscious state and vegetative state, was used as the quantitative tool of consciousness level, and 6 items whose scores were less than 4-5-6-3-2-3 were screened out. The subjects were divided into three groups: normal subjects group, microconscious state group, and vegetative state group. The normal group consisted of 7 subjects aged 20–30 years. There were 17 people in the microconscious state group and 19 people in the vegetative state group, and their ages ranged from 20 to 55. The details of the subjects in the microconscious state group and the vegetative state group are shown in Table 1.

2.2. Signal Acquisition Scheme. A 64-lead ActiveTwoSystem EEG acquisition instrument produced by BioSemi was used in the experiment, and the sampling rate was 2048 Hz. The data was collected in monopole lead mode, and A1 and A2 were selected as reference electrodes. According to the international 10/20 standard lead system, electrodes were placed on the scalp surface of the subject, and conductive gel was injected between the electrodes and scalp to make the resistance less than $5 K \cdot \omega$.

After the subjects entered the quiet state, the EEG acquisition experiment began. The EEG signals of the subjects in the resting state were collected for 60 s at first, then 120 s in the state of music stimulation, and finally 60 s in the resting state after stimulation. The stimulation source of this study is the climax chorus of Jasmine Flower, which is 120 s in length and plays at a sound level of 70 dB. In the experiment, the subjects listened to music with their eyes closed. For the subjects with consciousness impairment who could not close their eyes, they covered their eyes with a towel. During the acquisition process, there is no noise and high-power electrical equipment dry disturbance. The subjects were in repose, and the room temperature was controlled at 25°C.

2.3. EEG Preprocessing. In this study, EEGLAB Version 13_5_4B was used to analyze EEG signals on Matlab 2019A platform. Firstly, the EEG was filtered by depower frequency. According to the current frequency in China, the depower frequency was set to 50 Hz. Secondly, according to the rhythm characteristics of EEG, the cut-off frequency of bandpass filtering was set as low pass 80 Hz and high pass 0.5 Hz. According to EEGLAB, the waveform after filtering was observed, and the large disturbance and muscle artifact were removed so as to obtain the EEG signal after denoising. After noise reduction, the signal will still have artifacts, such as electrooculogram (EOG). Based on Matlab 2016a, ICASSO toolbox was used as the signal partition solution method based on InfomaxICA, and independent component analysis (ICA) was implemented for the EEG after noise reduction to remove artifacts.

3. Extraction of Musical Features

Matlab2016a was used to compile and translate environment, and MIRtoolbox version 1.7.1 was added to extract 5

TABLE 1: Information about MCS and VS participants.

Functional state of brain	Number of people	Age	CRS-R score	Microconscious or vegetative state time/ month	Gender Men or women
Microconscious state	17	53.82 ± 15.26	12.82 ± 4.14	3.10 ± 1.92	125
Vegetative state	19	47.79 ± 13.26	5.53 ± 2.37	4.05 ± 1.38	145

acoustic and musical characteristics of stimulus source Jasmine Flower. It includes fluctuation centroid, fluctuation entropy, pulse clarity, key clarity, and mode [13, 15]. Firstly, the window shifting method was used to sample music from zero seconds by using the window width of 3 s and overlapping with the front and rear windows of 2 s each [16]. Then, using MIRToolbox, the values of acoustic characteristics (fluctuation centroid, fluctuation entropy, pulse clarity, key clarity, and mode) of each acoustic segment are calculated.

4. EEG Feature Extraction

4.1. Calculation of Third-Order Tensor of EEG Signal. The spatial distribution (channel), time domain, and frequency domain of EEG signal are selected as the characteristics of the third-order tensor. In order to obtain the time-frequency domain characteristics of each lead of EEG signal of each subject as the third-order component of the tensor, short-time Fourier transform was used for time-frequency domain analysis of the signal [11]. The EEG signals of each lead were sampled by hamming window, which was 3 s wide and overlapped with front and rear windows for 2 s each. Thus, the size of the third-order tensor of each EEG signal is channel × frequency × time, where channel = 64, frequency = 158, and time = 120-artifact time, where artifact time refers to the time of removing part of signal due to large artifact during preprocessing.

4.2. Nonnegative CP Tensor Decomposition Based on HALS. Canonical polyadic (CP) decomposition and Tucker decomposition can be used to extract high-dimensional tensor components of signals. CP decomposition is the process of decomposing a given n-order tensor X into the sum of a series of rank tensor quantities. According to the order, tensors can be divided into first-order vectors, second-order matrices, and third-order and higher-order tensors. Similar to matrix decomposition, an n-order tensor X can be decomposed into the sum of R n-order tensor of rank [17]. Each rank tensor is a component of a tensor. A tensor of rank N is equal to the cross product of N orthogonal unit vectors times the energy coefficient. Thus, the CP decomposition of a tensor X of order N can be obtained as follows:

$$X = \sum_{r=1}^{R} \lambda_r \cdot \alpha_{r1} \cdot \alpha_{r2} \Lambda \alpha_{rN}, \tag{1}$$

where the tensor X is a tensor of order N, λ_r is the energy coefficient, and $\alpha_{r1}, \alpha_{r2}, \Lambda, \alpha_{rN}$ are the orthogonal unit vectors, and the symbol represents the tensor cross product. Nonnegative CP tensor decomposition is used in this study to decompose the third-order tensors obtained in Section 4.1

of this paper. In this process, a series of optimal nonnegative orthogonal vector combinations are approached continuously so that the remaining tensor norm $\|E\|^2$ approaches zero. The calculation process of the two norms of the remaining tensor $\|E\|^2$ is as follows:

$$\|E\|^2 = \left\| X - \sum_{r=1}^{R} \lambda_r \cdot \alpha_{r1} \cdot \alpha_{r2} \cdot \alpha_{r3}, \right\|_F^2. \tag{2}$$

In order to accelerate the convergence of the remaining tensor binary norm and reduce the dependence of computation force, the hierarchical alternating least squares (HALS) optimization process of nonnegative CP tensor decomposition is selected in this study [18].

4.3. Extraction and Screening of EEG Tensor Components. In Section 4.2 of this paper, the nonnegative CP tensor decomposition algorithm based on HALS is introduced. This algorithm will be used to decompose the third-order signal tensor of each subject obtained in Section 4.1 of this paper to obtain the components of brain electrical activity. The number of tensor components is extracted from the signal tensor and determined by Smooth DIFFIT [19]. All the tensor components extracted by the above methods contain three components, which are spatial distribution coefficient, time-domain envelope, and spectrum. The brain topographic map was drawn according to the spatial distribution coefficient of the tensor components, and then the tensor components satisfying the dipolar form were screened out, namely, the EEG tensor components [10, 20]. Then, the time-domain envelope components of the tensor components were analyzed by Pearson correlation coefficient with the five kinds of music time-domain characteristic values obtained in method 2. The threshold value of the correlation coefficient was calculated by the Monte Carlo method, and the components related to music characteristics were selected ($P < 0.05$). That is, the electrical activity of the brain corresponds to changes in musical characteristics [8, 11, 13].

4.4. Ratio Power Spectrum Analysis and Statistical Test. The EEG tensor obtained in Section 4.3 of this paper has three components: spatial distribution coefficient, time-domain envelope, and spectrum, among which the frequency domain component of the EEG tensor reflects the spectral characteristics of the component. According to the frequency domain component, the specific power spectrum, that is, the proportion of each node law, can be calculated to analyze whether the EEG signals of subjects with different levels of consciousness respond to music characteristics in rhythm. The ratio power spectrum of each rhythm is calculated as follows:

$$\text{ratio} = \frac{\int_{f_2}^{f_1} \text{psd}(\tau) d_\tau}{\int_{1}^{30} \text{psd}(\tau) d_\tau}, \tag{3}$$

where F1 and F2 are the lower limit and upper limit of frequency band of interest, respectively, namely, delta (1–4 Hz), theta (4–8 Hz), alpha (8–13 Hz), and beta (13–30 Hz). The spatial distribution component of the EEG tensor component represents the distribution of the component in the brain region. The higher the coefficient is, the closer the sampling point is to the source component that generates the EEG tensor component. Thus, the location of the responsive brain region where the source component occurs can be determined by a brain program. SPSS V.20 (SPSS Inc. Chicago, IL), ANOVA factor assay, and Scheffe's postassay for power spectrum ratios of EEG tensor components; $P < 0.05$ was considered statistically significant. Finally, the differences in the distribution of power spectrum and response brain regions of unrelated and related EEG tensor components were compared, and it was excluded that the differences in power spectrum and brain topography of the three groups were not related to music perception but may be caused by the differences in their own consciousness level.

5. Experimental Results

Through the tensor decomposition algorithm in Section 4 and the tensor component screening method in Section 4.3, 18 components were screened out from 7 normal subjects, 41 components were screened out from 17 cases of microconscious state, and 32 components were screened out from 19 cases of vegetative state. The results are shown in Table 2.

5.1. Ratio Power Spectrum Analysis and Statistical Test of EEG Tensor Components Related to Musical Features. According to the method proposed in this paper, all the EEG tensor components related to musical features were analyzed by ratio power spectrum analysis. Tables 3–7 show the ratio power spectrum analysis results of EEG tensor components associated with the fluctuation centroid, fluctuation entropy, pulse clarity, key clarity, and mode musical features, respectively.

Table 3 shows the average power spectrum of EEG tensor component ratio related to music feature fluctuation centroid. The proportions of alpha and beta waves in normal subjects were higher than that of theta and delta waves, while the proportions of theta and delta waves in minimally conscious and vegetative states were higher than that of alpha and beta waves. The proportions of alpha and beta waves of EEG tensor components of the three groups were statistically different (alpha wave: $F(2, 21) = 104.838$, $P < 0.001$; beta wave: $F(2, 21) = 10.418$, $P = 0.001$). The alpha wave proportion of the EEG tensor component in the normal group was higher than that in the microconscious state group ($P < 0.001$) and vegetative state group ($P < 0.001$). The beta wave proportion of the EEG tensor component in the normal group was higher than that in the microconscious state group ($P < 0.001$) and vegetative state

group ($P < 0.001$). There was no difference in the proportion of EEG tensor components in each rhythm band between the microconscious state group and the vegetative state group.

Table 4 shows the average power spectrum of the EEG tensor component ratio related to music feature fluctuation entropy. Since there are only two EEG tensor components related to fluctuation entropy in the normal group and the vegetative state group, independent sample statistical analysis is not performed. However, it can be observed that the proportion of alpha and beta waves in the normal group is higher than that of theta and delta waves, and the EEG tensor components in the microconscious state group and the vegetative state group are opposite. The alpha wave proportion of EEG tensor in the normal group was higher than that in the microconscious state group and vegetative state group. There was no difference in the proportion of EEG tensor in each rhythm band between the microconscious state group and the vegetative state group.

Table 5 shows the average power spectrum of EEG tensor component ratios associated with the musical feature key clarity. The proportions of alpha and beta waves in normal subjects were higher than that of theta and delta waves, while the proportions of theta and delta waves in minimally conscious and vegetative states were higher than that of alpha and beta waves. There were statistical differences in the alpha and beta proportions of EEG tensor components among the three groups (alpha wave: $F(2, 18) = 27.349$, $P < 0.001$; beta wave: $F(2, 18) = 6.758$, $P = 0.006$). The alpha wave proportion of the EEG tensor component in the normal group was higher than that in the microconscious state group ($P < 0.001$) and vegetative state group ($P < 0.001$). The beta wave proportion of the EEG tensor component in the normal group was higher than that in the microconscious state group ($P = 0.010$) and vegetative state group ($P = 0.022$). There was no difference in the proportion of EEG tensor in each rhythm band between the microconscious state group and the vegetative state group.

Table 6 shows the average power spectrum of EEG tensor component ratios associated with music feature pulse clarity. The proportions of alpha and beta waves in the normal group were higher than that of theta and delta waves, while the proportions of theta and delta waves in the slightly conscious state group and the vegetative state group were higher than that of alpha and beta waves. There were statistical differences in the alpha and beta wave proportions of EEG tensor components among the three groups (alpha wave: $F(2, 21) = 27.349$, $P < 0.001$; beta wave: $F(2, 18) = 6.758$, $P = 0.006$). The alpha wave proportion of the EEG tensor component in the normal group was higher than that in the microconscious state group ($P < 0.001$) and vegetative state group ($P < 0.001$). The beta wave proportion of the EEG tensor component in the normal group was higher than that in the microconscious state group ($P = 0.01$) and vegetative state group ($P = 0.022$). There was no difference in the proportion of EEG tensor in each rhythm band between the microconscious state group and the vegetative state group.

Table 7 shows the mean power spectrum of the EEG tensor component ratio related to musical feature mode. The proportions of alpha and beta waves in normal subjects were

Table 2: Statistics on the number of EEG tensor components correlated with five musical features among different consciousness level groups.

Grouping	Fluctuation centroid	Fluctuation entropy	Key clarity	Pulse clarity	Mode
Normal group	5	2	5	3	3
Microconscious state group	12	9	7	10	3
Plant state group	7	3	9	10	3

Table 3: The mean value of the power spectrum ratio of EEG tensor components correlated with the music feature fluctuation centroid.

Grouping	Delta wave	Theta wave	Alpha wave	Beta wave
Normal group	0 039 ± 0 055	0 096 ± 0 091	0 687 ± 0 193	0 170 ± 0 104
Microconscious state group	0.573 ± 0.405	0.279 ± 0.342	0.033 ± 0.022**	0.027 ± 0.017**
Plant state group	0.479 ± 0.442	0.390 ± 0.384	0.063 ± 0.040**	0.053 ± 0.067**

Note. *$P < 0.05$; **$P < 0.01$.

Table 4: The mean value of the power spectrum ratio of EEG tensor components correlated with the music feature fluctuation entropy.

Grouping	Delta wave	Theta wave	Alpha wave	Beta wave
Normal group	0 017 ± 0 024	0 046 ± 0 018	0 588 ± 0 132	0 380 ± 0 119
Microconscious state group	0.706 ± 0.307	0.138 ± 0.127	0.041 ± 0.025	0.031 ± 0.024
Plant state group	0.474 ± 0.433	0.387 ± 0.358	0.085 ± 0.077	0.080 ± 0.095

Table 5: The mean value of the power spectrum ratio of EEG tensor components correlated with the music feature key clarity.

Grouping	Delta wave	Theta wave	Alpha wave	Beta wave
Normal group	0 038 ± 0 085	0 047 ± 0 056	0 668 ± 0 295	0 115 ± 0 056
Microconscious state group	0.454 ± 0.392	0.152 ± 0.287	0.096 ± 0.103**	0.032 ± 0.021*
Plant state group	0.519 ± 0.414	0.345 ± 0.406	0.057 ± 0.065**	0.044 ± 0.043*

Note. *$P < 0.05$; **$P < 0.01$.

Table 6: The mean value of the power spectrum ratio of EEG tensor components correlated with the music feature pulse clarity.

Grouping	Delta wave	Theta wave	Alpha wave	Beta wave
Normal group	0 035 ± 0 012	0 054 ± 0 041	0 672 ± 0 064	0 226 ± 0 072
Microconscious state group	0.327 ± 0.412	0.349 ± 0.373	0.144 ± 0.242**	0.026 ± 0.021*
Plant state group	0.561 ± 0.425	0.299 ± 0.361	0.044 ± 0.044**	0.029 ± 0.024*

Note. *$P < 0.05$; **$P < 0.01$.

higher than that of theta and delta waves, while the proportions of theta and delta waves in minimally conscious and vegetative states were higher than that of alpha and beta waves. There was a statistical difference in the proportion of alpha wave of EEG tensor components among the three groups (alpha wave: $F(2, 6) = 5.79$, $P = 0.040$). There was no difference in the proportion of EEG tensor components in each rhythm band between the microconscious state group and the vegetative state group.

5.2. Statistical Analysis of the Distribution of EEG Tensor Components in Response Brain Regions Related to Music Features. According to the spatial distribution coefficient component of the EEG tensor obtained in this paper, the brain topographic map can be drawn, and the responsive brain regions of the EEG tensor can be determined. Tables 8–10 show the distribution statistics of EEG tensor components related to music characteristics in the normal group, the microconsciousness state group, and the vegetative

state group, respectively. In the normal group, the EEG tensors were distributed in the prefrontal lobe except 2 in the temporal lobe. In the microconscious group, only 6 EEG tensors were distributed in the prefrontal lobe, and the rest were mainly located in the temporal lobe. In the vegetative state group, only one EEG tensor was distributed in the prefrontal lobe, and the rest were mainly distributed in the temporal lobe. As shown in Figure 1, from left to right are the brain maps of the normal group with the response brain region of the prefrontal lobe tensor component, the brain maps of the microconscious state group with the response brain region of the temporal lobe tensor component, and the brain maps of the implant state group with the response brain region of the temporal lobe tensor component, respectively.

5.3. Statistics and Analysis of Ratio Power Spectrum and Distribution of Response Brain Regions of EEG Tensor Components Unrelated to Music Features. In this section, the ratio power spectrum and response brain area distribution

TABLE 7: The mean value of the power spectrum ratio of EEG tensor components correlated with the music feature mode.

Grouping	Delta wave	Theta wave	Alpha wave	Beta wave
Normal group	0 118 ± 0 054	0 183 ± 0 015	0 432 ± 0 273	0 267 ± 0 218
Microconscious state group	0.414 ± 0.451	0.466 ± 0.429	0.057 ± 0.049*	0.014 ± 0.008
Plant state group	0.589 ± 0.522	0.337 ± 0.515	0.033 ± 0.026*	0.014 ± 0.012

Note. $*P < 0.05$; $**P < 0.01$.

TABLE 8: The number of locations of EEG tensor components correlated with musical feature in the normal group.

	Frontal lobe	Temporal lobe	Parietal lobe	Posterior occipital lobe	Total
Fluctuation centroid	4	1	0	0	5
Fluctuation entropy	1	1	0	0	2
Key clarity	5	0	0	0	5
Pulse clarity	3	0	0	0	3
Mode	3	0	0	0	3
Total	16	2	0	0	18

TABLE 9: The number of locations of EEG tensor components correlated with musical feature in the MCS group.

	Frontal lobe	Temporal lobe	Parietal lobe	Posterior occipital lobe	Total
Fluctuation centroid	1	9	1	1	12
Fluctuation entropy	1	7	0	1	9
Key clarity	1	2	3	1	7
Pulse clarity	2	5	2	1	10
Mode	1	1	0	1	3
Total	6	24	6	5	41

TABLE 10: The number of locations of EEG tensor components correlated with musical feature in the VS group.

	Frontal lobe	Temporal lobe	Parietal lobe	Posterior occipital lobe	Total
Fluctuation centroid	0	5	1	1	7
Fluctuation entropy	0	0	3	0	3
Key clarity	0	5	2	2	9
Pulse clarity	1	6	2	1	10
Mode	0	1	1	1	3
Total	1	17	9	5	32
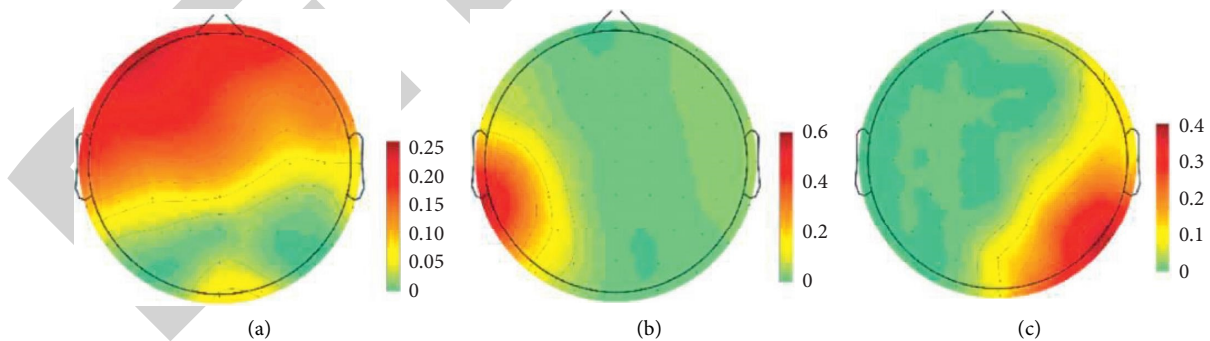
FIGURE 1: Spatial component of EEG tensor components correlated with musical feature. (a) Normal group; (b) MCS group; (c) VS group.

statistics of EEG tensor components unrelated to music characteristics were conducted in the three groups of subjects so as to exclude the possibility that the power spectrum and brain topographic map of the three groups of subjects were only caused by their different levels of consciousness and had nothing to do with music perception. There were 145 EEG tensor components in the normal group, 202 in the microconscious state group, and 307 in the vegetative state group.

Table 11 shows the mean power spectrum of the ratio of EEG tensor components unrelated to musical features of the three groups of subjects. The proportion of delta waves in the vegetative state group (0.629 ± 0.372) was higher than that in the microconscious state group (0.436 ± 0.385) and the normal control group (0.183 ± 0.265) (F (2,640) = 77.179, $P < 0.001$). The proportion of theta wave in the microconscious state group (0.240 ± 0.298) and the vegetative state

Table 11: The mean value of the power spectrum ratio of EEG tensor components not correlated with the music feature.

	Delta	Theta	Alpha	Beta
Normal group	0.183 ± 0.265	0.124 ± 0.157	0.483 ± 0.320	0.159 ± 0.105
Microconscious state group	$0.436 \pm 0.385^{*\#\#}$	$0.240 \pm 0.298^{**}$	$0.081 \pm 0.121^{**}$	$0.025 \pm 0.021^{**}$
Plant state group	$0.626 \pm 0.373^{*\#\#}$	$0.214 \pm 0.293^{**}$	$0.056 \pm 0.092^{**}$	$0.029 \pm 0.036^{**}$

Note. $P < 0.05$ versus normal group, $^{**}P < 0.01$ versus normal group, and $^{\#\#}P < 0.01$ MCS group versus VS group.

group (0.213 ± 0.293) was higher than that in the normal control group (0.124 ± 0.157) ($F (2,640) = 8.494$, $P < 0.001$). The proportion of alpha waves in the normal group (0.483 ± 0.320) was higher than that in the microconscious state group (0.081 ± 0.121) and vegetative state group (0.056 ± 0.092) ($F (2,640) = 308.538$, $P < 0.001$). Beta wave proportion in the normal group (0.159 ± 0.105) was higher than that in the microconscious state group (0.025 ± 0.021) and the vegetative state group (0.029 ± 0.036) ($F (2,640) = 299.129$, $P < 0.001$).

Table 12 shows the ratio power spectrum of EEG tensor components unrelated to music characteristics and the distribution of response brain regions in the three groups. In the normal group, 97 of 145 EEG tensor components were located in the prefrontal lobe. In the microconscious group, 44 of the 202 EEG tensor components were located in the prefrontal lobe, and 51 of the 307 EEG tensor components were located in the vegetative state group.

The ratio power spectrum of EEG tensor components unrelated to musical features was compared with the ratio power spectrum of EEG tensor components unrelated to musical features, and the ratio power spectrum of EEG tensor components unrelated to musical features was compared with the ratio power spectrum of EEG tensor components unrelated to musical features in Section 5.2. First of all, there was no difference in the proportion of delta waves of the EEG tensor related to music in the microconscious state group and the vegetative state group, while the proportion of delta waves of the EEG tensor unrelated to music in the microconscious state group was lower than that in the vegetative state group. Second, the theta wave proportion of the EEG tensor related to music in the normal group was lower than that in the microconscious and vegetative state groups, while the theta wave proportion of the EEG tensor unrelated to music in the normal group and the microconscious and vegetative state groups was different. Finally, the micro-consciousness and vegetative state groups and music characteristics of unrelated electrical tensor component proportion of response to a brain region located in the frontal lobe are higher than electrical tensor components related to music features, and normal controls associated with the time-domain characteristics of music electrical tensor component proportion of response to a brain region located in the frontal lobe are higher than the time-domain characteristics of the music not related electrical tensor components.

Therefore, by comparing the EEG tensor components unrelated to the temporal characteristics of music with those related to music, it can be seen that the two components of the response brain region distribution and power spectrum are different in the statistical results of the three groups of subjects. Based on this, according to the experimental results, it is concluded that the differences in power spectrum and brain topography of the three groups of subjects are related to music perception, not only caused by the differences in their own consciousness level.

In this study, the EEG signals generated by the subjects with different levels of consciousness under the stimulation of music were preprocessed with noise reduction and deartifacts. Then, based on the nonnegative CP tensor decomposition of HALS, the processed signals were decomposed by tensor decomposition to obtain the tensor components of the EEG. The time-domain component of the tensor component separately with five kinds of music features (fluctuation centroid, fluctuation entropy pulse clarity key clarity, and mode) and correlation analysis to extract the characteristics of music-related electrical tensor components, the power spectrum, and the distribution of response brain regions were analyzed. Finally, the differences in musical feature processing in different levels of consciousness were explored. According to the power spectrum of EEG tensor components related to music and the distribution of response brain regions in the three groups, it can be seen that there are differences in the rhythm and response brain regions of the subjects under music stimulation. In terms of rhythm, the ratio power spectrum analysis of the components obtained by tensor decomposition showed that, except for characteristic mode, the proportion of alpha wave and beta wave in response to EEG tensor components in normal conscious state was higher than that in the microconscious state and vegetative state. There was no significant difference in the proportion of each rhythm between the microconscious state and the vegetative state. In the normal conscious state, the proportion of alpha and beta waves responding to EEG tensor was higher than that of delta and theta waves, while in the microconscious state and vegetative state, the proportion of delta and theta waves was higher than that of alpha and beta waves. Based on previous studies on EEG rhythm, attention and high-intensity cognitive activity can cause the appearance of beta waves, and the present study found that the beta rhythm of EEG tensor components related to music in the microconscious state and vegetative state was significantly less than that in the normal conscious state. It can be speculated that the two groups of conscious states have weaker perception and attention to musical features. In terms of the response brain regions, the response brain regions in the normal state of consciousness were mainly concentrated in the prefrontal lobe, while the response brain regions in the microstate of consciousness and

TABLE 12: The number of locations of EEG tensor components not correlated with musical feature.

	Prefrontal lobe	Temporal lobe	Parietal lobe	After the occipital lobe	Total
Normal group	97	24	3	21	145
Microconscious state group	44	70	51	37	202
Plant state group	51	118	86	52	307

vegetative state were mainly in the temporal lobe. This means that as the level of consciousness decreases, the response of the prefrontal lobe decreases, while the temporal lobe basically maintains, supporting the importance of the prefrontal lobe for consciousness. For the brain mechanism of music processing, Koelsch proposed a hierarchical music processing model. According to this theory, it can be concluded that the normal state of consciousness to the fourth stage of music structure processing did not happen in a state of consciousness and plants because the fourth stage structure of musically activated processing is located in the prefrontal cortex, neither the conscious state nor the vegetative state is activated by the prefrontal cortex. Secondly, this study compared the frequency domain characteristics of components occurring in the temporal lobe of normal conscious state, microconscious state, and vegetative state and found that the responses of the three groups of subjects to the music characteristics of the EEG tensor components in rhythm distribution were different. The alpha and beta waves of EEG tensor in the normal conscious state were still higher than delta and theta waves, while theta and delta waves were the main components of EEG tensor in the microconscious state and vegetative state. This suggests that the level of consciousness decreases, and so does the temporal lobe's electrical rhythm in response to musical features.

6. Conclusion

It was found that the responses of normal subjects, microconscious subjects, and vegetative subjects to musical features were different in rhythm and response region. In terms of brain activation area distribution, the response of normal subjects to music was mainly concentrated in the prefrontal lobe, while the response of microconscious and vegetative state subjects to music was concentrated in the temporal lobe. In terms of rhythm distribution, the EEG response frequency of normal subjects to musical features was concentrated in alpha and beta bands, while the EEG response frequency of microconscious and vegetative state subjects was concentrated in theta and delta bands.

Data Availability

The experimental data of this research are available from the author upon request.

Conflicts of Interest

The author declared no conflicts of interest regarding this study.

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Retraction

Retracted: Analysis of Sino-Russian Media Cooperation and the Construction of International Online Public Opinion Discourse under the Dual Influence of Ecological and Online Environments

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] J. Zhang and C. Ma, "Analysis of Sino-Russian Media Cooperation and the Construction of International Online Public Opinion Discourse under the Dual Influence of Ecological and Online Environments," *Journal of Environmental and Public Health*, vol. 2022, Article ID 7740313, 11 pages, 2022.

Research Article

Analysis of Sino-Russian Media Cooperation and the Construction of International Online Public Opinion Discourse under the Dual Influence of Ecological and Online Environments

Juxi Zhang[1] **and Chongyu Ma** [2]

[1]*School of Journalism and Communication, Zhengzhou University, Zhengzhou 450001, China*
[2]*Foreign Studies College, Hunan Normal University, Changsha 410081, China*

Correspondence should be addressed to Chongyu Ma; machongyu@hunnu.edu.cn

In the context of traditional media, the media can dominate the topic and composition of public opinion, but in the context of the convergence of online media, the dominance of public opinion has gradually evolved from the direction of the coexistence of single items and pluralism, especially from the international level. In other words, the construction of the comprehensive strategic writing partnership between China and Russia in the new era has given a new orientation and connotation to the bilateral relations and cooperation in the new era. In the face of an increasingly complex international public opinion environment, media cooperation between China and Russia is crucial. Therefore, based on an in-depth analysis of the construction of the discourse power of international public opinion under the dual influence of the ecological environment and the network environment, the construction of the discourse power of international public opinion is discussed from the aspects of the construction of discourse objects, the construction of the main body, and the enrichment of the content of international communication.

1. Introduction

At the present stage, the development of media integration under the network environment has gradually formed an information communication channel with online newspapers, radio, and television as the main body [1]. With the support of network media, the transmission speed of information has been further improved, and people's access to information is more and more convenient. The huge information cluster can also meet the personalized needs of the audience. At the same time, it also indirectly has a certain impact on the guidance of public opinion of network media. Of course, the development of network media has also brought new changes to international communication. The in-depth development of social media has indirectly promoted the transformation and reconstruction of the right to speak. International communication has undergone great changes in media selection, actors, communication mode, communication content, and influence. Multimedia, rich and diversified video content presentation, and other forms of network television have gradually become an important position of international communication [2]. The construction of the comprehensive strategic writing partnership between China and Russia in the new era has given a new positioning and connotation to the bilateral relations and cooperation in the new era. In the face of the increasingly complex international public opinion environment under the network environment, the media of China and Russia must continue to deepen cooperation and jointly occur on international and regional issues, so as to better reflect the responsibility spirit and strategic cooperation effect of the two countries in order to build the voice of international

public opinion [3, 4]. Figure 1 shows the theoretical model of the generation of the discourse power of international public opinion in the network environment.

The basic viewpoints of ecological environment are adaptation viewpoint, selection viewpoint, holistic viewpoint, hierarchy viewpoint, dynamic viewpoint, evolution viewpoint, and synergy viewpoint. In more than 100-year history of ecological development, ecological environment research has gone beyond the scope of biology. Ecosystem is to use the concept of ecology to explain the relationship between organizations and the environment. All the mutual influence and interaction between enterprise organizations and individuals rely on their respective core capabilities to complement each other's advantages to achieve common realization. The complex economic groups formed by value innovation belong to the enterprise ecosystem. Ecosystems are interdependent and interact with their environment. With the emergence of computer networks and changes in the network environment, the traditional business model of organizations has undergone tremendous changes, and the impact of the environment on the organization has also expanded. The network environment is composed of technical and social aspects. The network ecological environment situation analysis can be customized. Network ecological purification requires an overall analysis of situational data. Situational awareness can be introduced into the analysis engine in the form of a plug-in, so that the analysis engine can be customized according to different business needs, and the analysis engine can be customized to make the special rectification of network ecology purification more effective and efficient. The future trend of the network ecological environment is predictable. One of the functions of situational awareness systems is forecasting, so forecasting models are introduced. In the network ecological environment, for the collected network ecological big data, through machine learning, the introduction of prediction models can better predict the future network ecology, provide support for decision-making, and reduce the occurrence of extreme network events.

2. Literature Review

For the theory of discourse power, many scholars have systematically expounded Foucault's theory of discourse and power to a certain extent and combed the relationship between discourse and power from a philosophical point of view. Some scholars define the concept of dialogue right from Habermas' communicative behavior theory and discourse politics theory. Some scholars start with Foucault's theory of discourse power, pointing out that the function of "discourse" is "empowerment." Some scholars elaborate on the connotation of dialogue right and international discourse right and put forward that only having discourse right can guide public opinion to develop in the direction beneficial to our side. Some start with the theory of ancient Chinese philosophy, expound the connotation, essence, and function of discourse, and emphasize the important role of discourse in the field of public opinion [5, 6].

According to the theory of international discourse power, some scholars have explained and defined the international discourse power from the perspective of international politics. Some explained in detail what is the right to speak, why our party should attach great importance to the right to speak, how to have the right to speak, and how to expand and strengthen the right to speak. Some scholars elaborated on the ideological transformation in China's diplomacy and the changes, main construction directions, and tasks of new China's diplomatic discourse. By analyzing the current international situation of international discourse power, some scholars put forward the opportunity of improving China's international discourse power. From the perspective of the community of shared future of mankind, some scholars analyze the definition of international discourse power by three main theoretical schools: power discourse power from the perspective of realism, institutional discourse power from the perspective of Neo liberal institutionalism, and development discourse power from the perspective of dependency theory. Some scholars put forward how to lead the promotion of China's international discourse power by building a community with a shared future for mankind. Some analyze the construction path of China's international discourse right from the construction task and concept of China's international discourse right in the new era. Based on the definition of international discourse power by three main theoretical schools, some scholars pointed out the current situation of imbalance, disorder, and anomie of the international discourse power system and put forward a Chinese plan for global governance of international discourse power reform from the perspective of a community of shared future for mankind [7, 8].

In the research of public opinion discourse power, scholars mostly discuss it from the perspective of discourse power theory or the news thought of Chinese state leaders. Some scholars have explained the discourse power and influence of media public opinion, pointed out that the discourse power and influence of media public opinion complement each other, and summarized the problems and countermeasures in the use of media public opinion discourse power. Some scholars have discussed the connotation of the discourse power of public opinion from the perspective of discourse power and proposed to expand and strengthen the discourse power from multiple perspectives. Some scholars emphasize that news communication should first pay attention to the right of discourse, strengthen the awareness of the right of discourse, and exercise the right of discourse of the media. Some scholars emphasize that the core of public opinion guidance lies in the competition for the right to speak, think that the main elements of the right to speak are the right to speak, the right to spread, and the right to guide, and put forward a new path of public opinion guidance. Some scholars pointed out that news and public opinion are an important carrier for a political party to master the right to speak [9]. The discourse power of news public opinion should obey certain political needs and guide the trend of news public opinion. Some scholars focus their research on how to reconstruct the discourse power of public
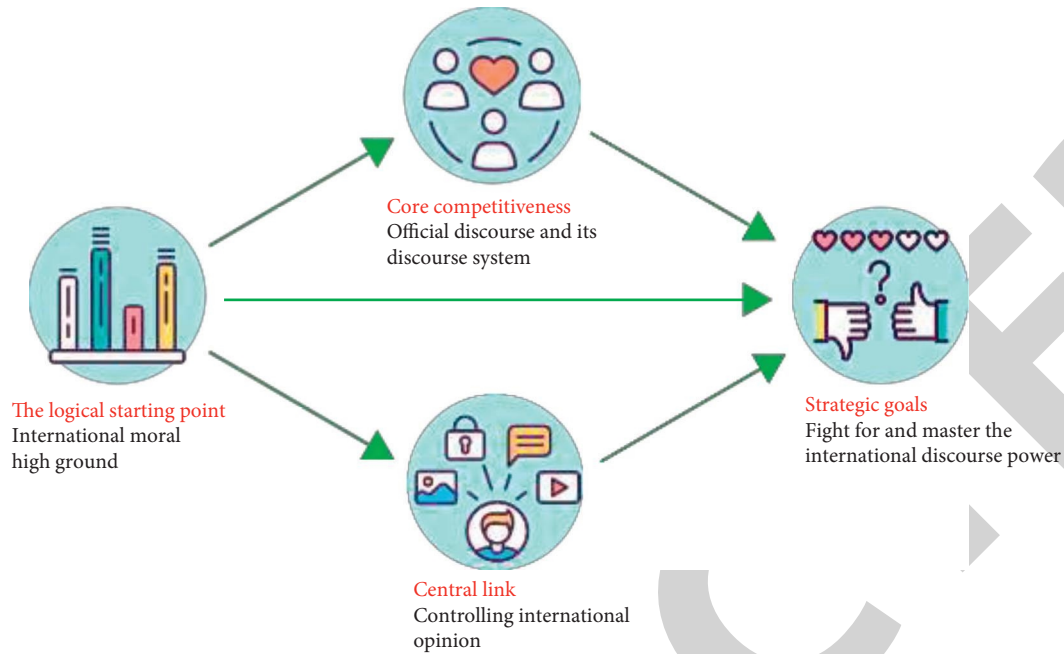
FIGURE 1: Theoretical model of the generation of discourse power of international public opinion under the network environment.

opinion in the context of strategic communication and put forward five reconstruction paths to give full play to the strategic communication mechanism.

Thus, the academic research on the guidance of public opinion and the discourse power of public opinion focuses on two focal points: one is the research on the theory of "discourse power" of public opinion, and the other is the research on how to compete for the discourse power of public opinion. To sum up, most scholars believe that the focus and core of the guiding power of public opinion and the discourse power of public opinion are "discourse power." Only by recognizing the importance of "discourse power" can we achieve due development in the exercise and competition of discourse power.

3. Analysis of the Foundation and Current Situation of the Construction of the Right to Speak of International Public Opinion under the Dual Influence of the Ecological Environment and the Network Environment

3.1. Take the Initiative to Open Up and Win Wide Public Opinion. In the face of the complex and changeable situation in today's world, China has gradually embarked on the road of active diplomacy and active opening-up, striving to create a new diplomatic situation and strive for the recognition of the international community. China adheres to the diplomatic strategy of "periphery is the primary, major countries are the key and developing countries are the foundation." Fifth, China actively promotes and improves the development of relations with other countries and adheres to being good with its neighbors, seeking common ground while reserving differences and peaceful coexistence. Apart from a few countries that have cracks with China due

to problems left over by history or other bad intentions, China maintains friendly relations with most countries. At the diplomatic level, China-Russia comprehensive strategic partnership enables the two countries to support each other and further maintain the peaceful ties of bilateral relations. China-EU relations have generally maintained stable development, and there are common contradictions based on common interests. At the same time, China actively carries out multilateral diplomacy, participates in the settlement of international hot issues, takes the initiative to assist countries with relatively backward development, and assumes the international responsibility of a big country [10, 11]. In recent years, the Chinese concept of the "the Belt and Road" and the "community of shared future for mankind" has won the attention of relevant countries since it was put forward. Through this, the international community has seen China's determination and sincerity to regard the people of the world as one and contribute to the overall development of all countries, nations, and the world. In terms of media cooperation, after officially establishing diplomatic relations with other countries, China has conducted multilateral exchanges with other countries in the field of journalism. By carrying out different degrees of exchange activities with countries with diplomatic relations in the fields of newspapers, book publishing, news, radio, and television, we can build an external communication system for other countries [12]. At present, Xinhua news agency, international radio and CCTV, and other media have achieved landing and localized production in many countries.

After years of diplomatic activities and media exchanges, China has strengthened its relations with other countries through a new situation of good diplomacy, which has won the recognition and support of the international community, especially the recognition of the majority of developing countries. Overall, China's peaceful and friendly diplomatic

activities over the years have shaped the image of a responsible big country in front of the people of the world and won the basis of public opinion for itself. China is no longer isolated in the international community, nor will it allow the western media to misread our information and attack us by public opinion [13, 14].

In recent years, the proportion of China's GDP in the world's GDP has increased year by year. At present, China has jumped to the second place in the world and become a booster of world economic growth. In 2007, China's contribution rate to world economic growth surpassed that of the United States for the first time, becoming the first in the world. Today, many international economies are deeply benefited by China's economic development and have closer ties with China's economy. Economic growth has promoted the rapid development of other areas of the country, increased economic investment in science and technology, military, national defense, and other fields, and effectively promoted the steady improvement of the country's overall strength. Table 1 shows the GDP ranking of countries in the world in 2019.

Although countries have long recognized the inequality and imbalance of the international discourse pattern and deeply understood the importance of the right to speak and the initiative, the actual situation has rarely been changed. After the 1990s, China's ability to influence the world has gradually increased, "hard power" drives "soft power," and China's discourse expression has gradually been accepted and recognized by the international community, which is mainly reflected in two aspects [15].

First, foreign media pay close attention to China. The in-depth development of globalization, the rapid renewal of information technology, and the impact of China's increasingly powerful comprehensive national strength on the world have all made foreign media pay unprecedented attention to China. The early reports of Western media on China were mainly political issues, and there were many negative reports [16]. Since the new century, with the understanding of China, especially with the continuous improvement of the news opening and news release system, the increasing Chinese reports by Western media have become more and more close to the reality of China, and the balanced reports are increasing.

Secondly, the voice from China is gradually accepted. As a developing and emerging country, with the enhancement of its comprehensive national strength and the improvement of its international status, especially the expansion of the international influence of the development model of socialism with Chinese characteristics, China has objectively posed an impact and challenge to the value system, development model, and even acceptance psychology of the western world, which is difficult for those who have long occupied the dominant position to accept calmly and willingly. We should pursue the victory and realize the international recognition of our due voice of international public opinion to the greatest extent in the process of promoting the reform and reconstruction of international voice, which is related to the long-term interests and development in the future.

3.2. Analysis on the Current Situation of the Construction of the Discourse Power of International Public Opinion from the Perspective of New Media. The visual culture represented by ubiquitous and all-time online video is occupying the world. Video services under the names of video portals, video websites, and online TV stations are becoming the focus of global Internet applications, social attention, and the development of radio and television. Since 2017, the "TikTok" short video has become popular all over the world. By 2019, its overseas version of "TikTok" has been implemented in 75 languages in 150 countries around the world. By the first quarter of 2020, TikTok's global total downloads exceeded 2 billion (regardless of the third-party Android platforms in China and other regions), and the downloads of app store and Google play in a single quarter exceeded 300 million, making it the mobile application with the highest downloads in the world (see Figure 2). TikTok enriches and disseminates short video content from a global perspective through the access of localized content in various regions. It is a successful case of "going global" mobile short video application.

3.2.1. The Main Object of Discourse Construction of International Public Opinion

(1) First, Distribution by Region. According to the region of the audience, we can divide the audience of international public opinion into China and foreign countries. Foreign audiences can be divided into western countries and non-western countries. In terms of audience division between China and foreign countries, mainstream media often spread to audiences outside China by setting up different media platforms [17]. For example, the "people's network" of the people's Daily has a Chinese version and an overseas version, respectively, which realizes the synchronization of the content dissemination of the same media for different audiences. Table 2 shows the distribution of Xinhua news agency abroad:

(2) Second, Distribution by Media. Taking people's daily and people.com as examples, for different paper and online media, there are clear differences in the choice of discourse objects between them (see Table 3). Secondly, emerging media, such as search engine represented by Baidu, news client represented by Tencent News, social media represented by WeChat, and short video media represented by TikTok, have very different audience choices due to their different communication characteristics and modes (see Table 4).

3.2.2. Audience Orientation of China's International Public Opinion Discourse.
Influenced by the multiple factors of "personalization" and "socialization" of network users, the new network media take more account of the autonomy and differentiation of the audience and fully understand the uncontrollable characteristics of the network audience in the process of international public opinion guidance. For

Table 1: Ranking of world GDP (2019).

Ranking	Name	GDP (USD, IMF' 2019)	GDP (USD, UN' 2016)	Per capita GDP	Population in 2019
1	America	21.34 trillion	18.62 trillion	$64866	329064917.00
2	China	14.22 trillion	11.22 trillion	$9916	1433783686.00
3	Japan	5.18 trillion	4.94 trillion	$40803	126860301.00
4	Germany	3.96 trillion	3.48 trillion	$47463	83517045.00
5	India	2.97 trillion	2.26 trillion	$2176	1366417.75
6	Britain	2.83 trillion	2.65 trillion	$41897	67530172.00
7	France	2.76 trillion	2.47 trillion	$4240	65129728.00
8	Italy	2.03 trillion	1.86 trillion	$3346	60550075.00
9	Brazil	1.96 trillion	1.80 trillion	$9239	211049527.00
9	Canada	1.74 trillion	1.53 trillion	$46487.00	37411047.00
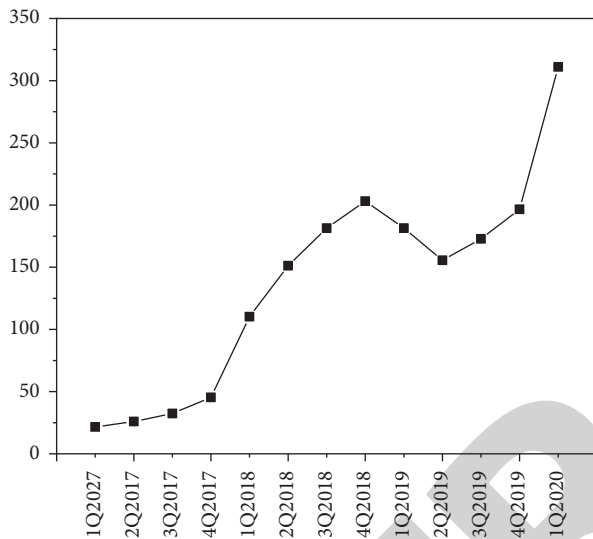
Figure 2: Global downloads of TikTok (unit: million times).

example, the target audience set by "People's Network" is different from that of "People's Daily" (see Table 5).

In terms of information dissemination, although Xinhua News Agency shoulders the important task of external communication of official mainstream media, it not only focuses on a certain region, but also broadens its vision to the global scope and transmits information in an all-round way. Xinhua news agency has not only set up hundreds of branches around the world; moreover, on the new online media, it has opened Chinese and foreign language websites at the same time and opened an official account on the global social media platform. See Tables 6 and 7.

CGTN China International Television (global television network) is under the command of Beijing headquarters, including the global operation of overseas regional production centers, reporter stations, and other dispatched agencies in various languages. It has six TV channels in English, Spanish, French, Arabic, Russian, and records, a video news agency and a new media cluster dominated by mobile news networks. It has implemented the whole channel or some programs in more than 170 countries and regions around the world. Previously, the number of fans of CGTN's official Facebook account exceeded 100 million, becoming the largest news media in the world. The YouTube account has more than 300 million news video hits, ranking first among the central media. CGTN new media cluster has

become one of the main channels for international audiences to understand China. Table 8 shows the number of major media websites in China.

Through the classified statistics of news topics (taking the English version of people's network as an example, see Table 9), and through the proportion of Politics (policy, democracy, diplomacy, etc.), economy, culture (education, tradition, etc.), society (people's livelihood, disaster, etc.), science, technology, environmental protection, and health in the reports, we can see the distribution of news topics of "people's network." Among the 70 news reports, there are 30 political news, 18 economic news, 4 cultural news, 6 social news, and 12 science, technology, sanitation, and agriculture news. Among them, political news and economic news account for the largest proportion, accounting for 43% and 25.7%, respectively. It is worth mentioning that, in the political and diplomatic relations reports, the reports on China US relations account for almost half of such reports, which is the most common topic in the news reports reflecting China US relations. In addition, because the third Import Trade Expo is in progress during this period, there are also 6 news items on the theme of the Expo.

As can be seen from Table 10, among the 70 headline news reports on the front page of the English version of renmin.com, there are 49 stories featuring China, accounting for 70% of the total sample, 9 stories featuring "China + other countries," accounting for 12.9%, and international news accounting for 2.8%, with only 2 stories. It can be said that news reports with China as the protagonist or with direct interests with China account for 86% of the total news, nearly nine-tenths of the total. And less than one-fifth of all news reports focus on other countries, including 9 in the United States, accounting for 90% of the news of "other countries," with the highest proportion.

In the era of new media on the Internet, the news sources of the media are no longer single, and they are interviewed, edited, and released by their own journalists. They have more diversified news sources [18]. As the official mainstream media news website, the English version of renmin.com mainly comes from authoritative news media. Among the 70 news reports, 42 were from Xinhua news agency, accounting for 60%, ranking first. The news from People's Daily and People's Network was 11 and 11, respectively, accounting for 15.75%. In addition, there are 3 news stories from China Daily, 2 news stories from Global Times, and 1 news story from CGTN. See Figure 3 for source analysis.

Table 2: Regional distribution of Xinhua news Agency branches abroad.

Region	Asia pacific region	Eurasian region	Middle east	American region	African region
Quantity	22	23	19	19	19
Proportion	21.50%	22.50%	18.60%	18.60%	18.60%

Table 3: Audience selection of people's daily media in different media platforms.

	People's daily	People's network (news website)	Official microblog of people's daily	Official WeChat official account of people's daily
Audience range	Mainland readers, overseas Chinese and compatriots in Hong Kong, Macao and Taiwan, but excluding foreigners who do not understand Chinese.	There are random internet users who have internet habits all over the world and often browse the web page.	Internet users who are used to relying on microblog for information.	Network users who rely on WeChat official account to obtain information.
Characteristic	Fixed and single scope	Random and wide range	Younger and diversified	Multilevel and multiage

Table 4: Main audience groups of emerging media platforms.

	Media type	Target user	User scope
Baidu	Search engines	Ordinary netizens who need to collect information;	Global
Tencent news overseas edition	News website	Enterprise users who need to promote information collection.	Global
WeChat	Social media	A group that uses the internet to browse news content.	Global
TikTok	Short video social platform	Social media users	Global

Table 5: Comparison of audience positioning between "people's Daily" and "people's network."

	People's Daily	People's Network
Audience range	Mainland readers, overseas Chinese and compatriots in Hong Kong, Macao and Taiwan, but excluding foreigners who do not understand Chinese.	Internet users who have the habit of surfing the internet and often browse the web page are random.
Audience age	Care about people over the age of 30 with mature political thought.	The age range is broad, but it is younger as a whole.
Audience professional structure	Mainly the staff of political party departments, government agencies, institutions and social organizations.	There is no obvious scope, and the occupational structure is complex, involving many fields such as politics, finance, science and technology.
Audience education level	With high cultural and educational background.	There are high or low education, with a large difference.
Audience social status	Generally high status in society.	Social status has both high and low, with a large gap.
Audience income level	Relatively stable income groups. The income gap between audiences is small.	Groups with relatively unstable income levels. The income gap of the audience is large

Table 6: Comparison of Chinese and foreign branches of Huashe.

	Branch	Total number of branches
China	33	53
Foreign country	102	180

It is analyzed from two aspects, that is, news theme and reporting tendency, reporting protagonist and reporting tendency. The first is the news theme and reporting tendency. From Table 11, there are 21 positive tendency reports, including 6 political news, 6 economic news, 4 science and technology news, 1 social livelihood news, and 1 culture, environmental protection, health, and agriculture news. From Table 12, among the reports with negative tendency, 6 are political news, 1 is economic news, and 1 is cultural news.

From the perspective of the relationship between the reporting protagonist and the reporting tendency, in positive reports, there are as many as 18 with China as the

reporting protagonist and 3 with "China + other countries" as the reporting protagonist. In this way, all positive reports are either dominated by China or have direct interests with China. Among the negative tendency reports, there are 4 reports on China US relations, including "decoupling between China and the United States is bad for everyone," "persecution of Chinese journalists by the United States," "American interference in Hong Kong," and "American political bullying"; there are 4 reports with the United States as the protagonist, involving American politics, economy, and culture [19].

From the perspective of media brand communication power, the communication power of central news media websites in overseas social media platforms is shown in Table 13. The highest communication power of each platform is as follows: Xinhua ranks the highest in the communication power of Google and twitter, China Radio Network (CNR) ranks the highest in the communication

Table 7: Comparison of Chinese and foreign social media official accounts opened by China news agency.

Platform set up	User scale	Platform set up	User scale
Sina Weibo	101.2 million (fans)	YouTube	103万
WeChat official account	20 million+ (fans)	Facebook	8752万
TikTok	35.62 million (fans)	Twitter	1259万

Table 8: Number of foreign language channels (websites) of major media websites in China.

Website	Number of foreign languages	Typical languages
Xinhuanet	7	English, Spanish, French, Russian, Arabic
People's network	6	English, Japanese, French, Spanish, Russian
China daily	2	English, French
International online	61	English, Japanese, French, Russian, German, Spanish
China network television	5	English, Spanish, French
Xinhuanet	7	English, Spanish, French, Russian, Arabic

Table 9: Distribution of headlines and news topics on the English version of Minwang news website.

Subject category	Detailed category	Quantity	Special remarks
Politics	China	15	
	Other countries/International politics	6	Including China US diplomacy 4
	Diplomatic relations	9	
Economics	Chinese economy	16	Including the expo 6
	World economy	2	
Culture	Chinese culture	3	
	Culture of other countries	1	
Sociology	China	5	
	International	1	
Technology and environmental protection	China	10	

Table 10: Distribution of protagonists in the headlines of the English version of the People's Daily news website.

Report protagonist		Quantity
China	China	49
	China + other countries	9
Other countries	USA	9
	Austria	1
International		2

power of Wikipedia, People's Network ranks the highest in the communication power of Facebook, and China Daily ranks the highest in the communication power of Instagram.

In terms of audience size, after years of audience accumulation, China's news media have formed a considerable number of audience groups (see Table 14). China's influential traditional mainstream media, relying on rich funds, advanced technology, policies, talents, and other resources, continue to improve themselves in external communication, and most of their English news websites have strong communication power overseas.

After information circulates in the international public opinion market, it will produce short-term or long-term, expected or unexpected diversified communication effects, including the impact and results on the general audience, news media, or other media institutions of other countries and the international community. Through the guidance of media public opinion, discourse communication acts on people's cognition and behavior system, which will produce corresponding discourse effects and cause changes in people's cognitive institutions, value system, emotional attitude, and behavior to a certain extent, involving multiple levels such as cognition, attitude, and action, so as to obtain the effect feedback from the audience [20]. Whether the audience effect feedback meets the communication expectations of the discourse subject is directly related to the effect of communication activities, which reflects the discourse influence of a country's media.

4. The Construction of the Discourse Power of International Public Opinion under Sino-Russian Media Cooperation under the Dual Influence of Ecological Environment and Network Environment

4.1. Based on the High Political Mutual Trust and Close Interest Ties between the Two Sides. First of all, the Chinese and Russian media should adhere to "content is king," strengthen in-depth news cooperation, and improve the ability of setting the international agenda. With the popularity of the Internet, the ways for the audience to obtain information are increasing, and the problem of excess information is becoming more and more prominent. Chinese and Russian media should continue to enhance the public reliability of news gathering and editing, highlight authoritative views and voices, and create "the first source of information" and "the first right of interpretation" in a large
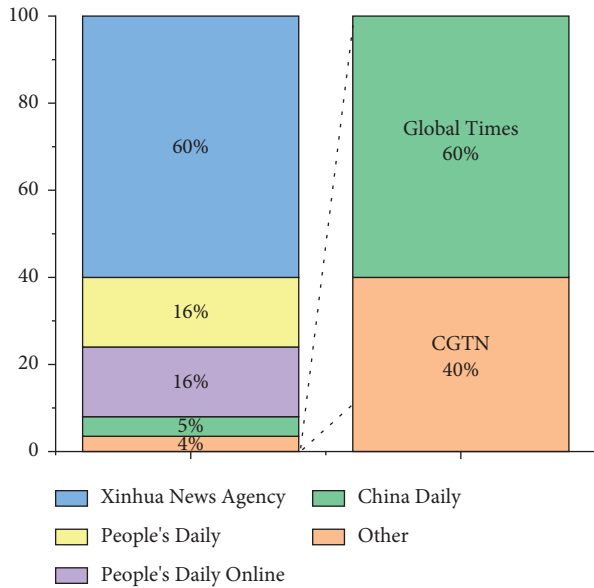
FIGURE 3: Distribution of headline news sources on the English version of People's Daily news website.

amount of information. Through opinion guidance and public opinion guidance, the audience can better understand the changes of the objective situation. The media of the two countries need to further increase the dimension and thickness of their reports on each other. They should not only actively voice in international issues dominated by themselves or involving each other, but also coordinate with each other in the reporting of major events related to the world political pattern [21]. After the "law revision storm" in Hong Kong in 2019, the special report "uncover the mask of Hong Kong" launched by "Russia today (RT)" has aroused widespread concern in the international community. The report focused on the behind the scenes of the situation in Hong Kong, unveiled the "figure of Washington" under the mask, and was considered by the majority of netizens to have issued a "voice of justice," which has become an example of the coordinated voice of the media of the two countries to influence international public opinion.

Secondly, in the context of media convergence, the two sides should break through the mindset, actively create highlights of cooperation in the field of new media, and contribute wisdom to international cyberspace governance. With the in-depth integration and development of media, the boundary between traditional TV media and emerging media has become blurred. The definition and competition for the field of public opinion are also gradually changing. Today, there is no need to "deliberately divide mass communication and interpersonal communication, audience scene and user scene, people's oral public opinion field, and mainstream media public opinion field. As long as there are people, groups, circles, and social places and platforms that can produce effective communication and influence, they should take the initiative." Therefore, relying on the good cooperation of traditional media, China and Russia should actively explore a wider range of linkage platforms including PC, app, and social networking. As a

new media exchange platform of "resource accommodation, content integration, mutual publicity, and interests' integration," the "China Russia headline client" is one of the fruits of the continuous cooperation between the media of the two countries in line with the development of the times. The client was jointly built by the former China Radio International and the "Russia Today" international news agency, which gathered the advantageous resources of the mainstream media, fully took care of the needs of both audiences, and achieved good communication results. At present, China and Russia are constantly exploring cooperation paths of mass collection, multiple generation, and multiple communication, in order to realize resource sharing and complementary advantages in the field of new media. On the basis of the platform, the media should make full use of the cross-border, cross time, and even cross language characteristics of network communication, focus on the commanding heights and key points of global issues, the hotspots, and highlights of friendly exchanges between the two countries, work together to create high-quality content, open up communication channels, and jointly expand their influence in the international public opinion field and cyberspace [22]. In particular, the global public field in which netizens share and discuss international affairs in the social network scene should be fully considered. At present, the number of Internet users in China and Russia is nearly 1 billion, which is the backbone of the Internet public opinion field. According to the attributes and characteristics of social communication, Chinese and Russian media should occupy the voice of civil networks by jointly holding activities, creating "opinion leaders" and other flexible ways.

4.2. Strengthen Technical Exchanges and Cooperation and Enable Content Production and Influence Formation through Technological Innovation. New technologies and applications have revolutionized the media field and opened up new development space for content production. China and Russia are both big countries in the development of new media, with similar development background and foundation, such as rising industrial demand and strong technological R&D strength. Guided by advanced technology, the two sides should further promote the cooperation and layout of the media of the two countries in the fields of "5 g + 4 K/ 8 K + AI" and build a media technology innovation community. Both sides need to strengthen the research and application of new generation information technologies such as artificial intelligence, blockchain, 5G, and big data in the field of network communication, timely grasp new trends, and develop new products, so as to make technology the biggest support for the evolution and breakthrough of the Internet. The period from 2020 to 2021 is the "year of scientific and technological innovation between China and Russia," jointly determined by the two heads of state, and media technical cooperation is its due meaning. Both sides should seize the favorable opportunity to strive for the transformation of media production mode and content form, so as to meet and occupy the needs of more users.

Table 11: Positive tendency of headline news reports on the English version of People's Daily news website.

Theme	Report protagonist	Attitude keywords	Reporting tendency
Environment protection	China	High-quality, greener	Positive
Politics	China	Far-sighted	Positive
Politics diplomacy	China Finland	Thrive	Positive
Science and technology	China	Aided by technology	Positive
Politics diplomacy	Chinese/English	Recovery	Positive
Society people's livelihood	China	Improving	Positive
Politics	Hong Kong, China	Timely and essential	Positive
Agriculture	China	High yield	Positive
Economics	China	Help and stimulate consumption	Positive
Culture religion	China	Freedomfully	Positive
Economics	China	Pushes	Positive
Science and technology	China	Stronger momentum	Positive
Politics	China	Success	Positive
Technological innovation	China	New high	Positive
Politics diplomacy	China Finland	Friendly relation	Positive
Economics	China	Upward	Positive
Economics	China	sincerity, sense of responsibility	Positive
Science and technology	China	Remarkable performance	Positive
Economics	China	Provides impetus	Positive
Medical and health work	China	Promising	Positive
Economics	China	Growth	Positive

Table 12: Negative tendency of headlines on the English version of People's Daily news website.

Theme	Report protagonist	Attitude keywords	Reporting tendency
Politics diplomacy	China America	Unrealistic, harmful	Negative
Economics	America	Threaten	Negative
Culture	America	Threatens	Negative
Politics diplomacy	China America	Persecution, suppression	Negative
Politics diplomacy	China America	Meddling in	Negative
Politics	America	Deepeningdivide	Negative
Politics	America	Division, anxiety	Negative
Politics	America	Politicalbullying	Negative

Table 13: Ranking of communication power of foreign social media platforms of central news websites.

Platform ranking	Google	Wikipedia	Twitter	Facebook	Instagram
1	Xinhuanet	China broadcasting network	Xinhuanet	People's network	China daily
2	China news network	International online	People's network	China network television	China news network
3	Taiwan, China network	China daily	China daily	Xinhuanet	China Tibet online
4	China daily	China network television	China news network	China daily	Guangming net
5	International online	China news network	Guangming net	China net	International online

Table 14: Audience size of major social media platforms of Chinese media.

Media platform	Microblog (number of fans)	TikTok (number of fans)	YouTube (number of fans)	Facebook (number of fans)	Twitter (number of fans)
Xinhua news agency	100.28 million	35.689 million	1.02 million	87.52 million	12.569 million
China Daily	59.30 million	32.062 million	0.0356 million	103.612 million	4.347 million
People's Daily	123.17 million	12000 million	0.184 million	86.174 million	7.043 million
CRI international online	4.35 million	4.796 million	None	24.645 million	76.5 million
CGTN China international television	5.44 million	7.967 million	2.00 million	1.1257 million	13.724 million

4.3. Make Full Use of Multilateral Cooperation Platforms to Enhance the Driving Force and Leadership of Chinese and Russian Media. China and Russia are not only members of the UN Security Council, but also carry out close cooperation under the framework of SCO, BRICs, and other international organizations. With the construction and docking of the "the Belt and Road" and the "Eurasian Economic Union," the exchanges between the two countries and relevant countries along the line have been deepened. Today, with the rapid development of informatization and digitization, it is in the interests of all parties to effectively voice multilateral cooperation.

China and Russia should make full use of the media cooperation mechanism under the framework of relevant organizations to promote institutionalized and normalized practical cooperation between the media of Member States, strengthen exchanges and coordination, make use of each other's strength and voice together, and carry out news reporting cooperation on major regional and international issues [23]. Led by China and Russia, we will strengthen the establishment of an Internet cooperation mechanism among Member States, expand the integration and interaction of new media, finally realize the mutually beneficial and win-win situation of "cyberspace," and promote the construction of a good public opinion environment and communication order [24, 25].

5. Conclusion

Under the dual influence of the ecological environment and the network environment, people are more free to express their views on social events and national political events through the network media. The views expressed by each person represent the venting of personal views, either rational, perceptual, objective, or subjective. The views expressed by each person represent the venting of personal views, either rational, perceptual, objective, or subjective, which will affect the voice of public opinion of online media. Some extreme, false, provocative, and even malicious attacks and abuse will often lead online media astray. Therefore, under the background of media integration, network media should take effective strategies to guide public opinion to the track of health and order in line with the mainstream values of society. In the field of international communication, behind the right to speak is the contest between the country's hard power, soft power, and the country's position in the global system. The "rise of other parts of the world" led by emerging countries led by China and Russia has become a major theme of world politics and economy in the 21st century. With the improvement of national comprehensive strength and influence, Chinese and Russian media should have a matching position in the world communication pattern. At the same time, in order to compete for national influence and maximize national interests, the media of the two countries need to give full play to their constructive role. Therefore, standing at the new historical starting point of China Russia relations and global governance pattern, the two sides should comply with and grasp the development trend of digital media, learn from each other, constantly

expand the field of cooperation, innovate the content of cooperation, gradually enhance the influence of international public opinion, and promote the establishment of a new global media order.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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Research Article

Analysis on the Influence of Western Ecological Aesthetics on Environmental Design of China's "Beautiful Countryside"

Weiwei Li (ID)

The Fine Arts and Design Faculty, Xuchang University, Xuchang, Henan 461000, China

Correspondence should be addressed to Weiwei Li; 12007044@xcu.edu.cn

At this stage, the promotion of China's agricultural revitalization plan has provided new demands for the development of agricultural construction. In the process of urban and rural planning, more and more attention has been paid to the protection of rural traditional culture and aesthetic values, as well as the requirements of characteristic aesthetics. In recent years, as we pay more and more attention to the environmental protection ability and aesthetic ability of rural life, we also pay more attention to improving the rural environment, promoting rural rejuvenation, and paying attention to shaping the livable space quality of rural living environment to meet the needs of modern life and soul. "Beautiful countryside" is one of the modern development concepts explicitly put forward by China, which advocates the harmonious symbiosis aesthetic idea of "harmony between man and nature." Building a beautiful countryside is the key point of rejuvenating the countryside, and the exploration of rural aesthetics is also the important significance of realizing the great rejuvenation goal of China's rural areas. Environmental design in the construction of "beautiful countryside" is a major decision and historical task for building a new countryside in China, and building landscape design suitable for the needs of rural development is the current requirement of social development. The article firstly analyzes the challenges and opportunities of China's "beautiful countryside" environmental construction; secondly, by digging into the philosophical ideas of deep ecology, ecological aesthetics, and the relationship between man and land in the West, it analyzes the application strategies and practical methods of these practical philosophies. It provides corresponding theoretical and practical enlightenment for my country's "beautiful countryside" environmental design strategy.

1. Introduction

With the gradual development of urbanization, the long-term and disorderly urbanization construction occupies a large amount of rural resources, and the rural environment is continuously damaged [1]. Unbalanced economic development has led to more and more polarization of space, resulting in widespread social and economic problems in rural areas and more "urban villages" were left and added in the city. On the one hand, the development of modern urbanization in China has encountered obstacles; on the other hand, the historical and cultural heritage of traditional villages has disappeared, the main role of traditional rural economic development has been ignored, traditional culture and modern life elements are mixed in the urban-rural fringe, and a large number of traditional cultural heritage has been

destroyed [2]. This undoubtedly brings many challenges and difficulties to the construction of beautiful countryside in China. How to find a balance between towns and villages has become the main difficulty. The Ministry of Housing and Urban-Rural Development of the People's Republic of China has calculated the changing trend of the number of villages in my country from 2009 to 2017. According to the "2017 Urban and Rural Construction Statistical Yearbook Data" released by the Ministry of Housing and Urban-Rural Development, the number of villages in China in 2017 decreased to 2.449 million, a year-on-year decrease of 6.4%. Compared with 2.73 million in 2010, a decrease of 10%, as shown in Figure 1 [3]. This shows that with the intensification of modernization and the invasion of urbanization, China's rural areas are largely damaged. In addition, the environmental humanistic value and artistic value in the township construction have not been

Figure 1: The number and changes of villages in China from 2009 to 2017.

paid enough attention. With the lack of effective and scientific design and control of agricultural development in the past, and the natural change caused by investors, the contradiction between agriculture, and housing has become more and more obvious [4]. Enterprises and communities pay more attention to production and business activities in agricultural areas, and there are situations that damage the agricultural landscape, such as deforestation and land reclamation. In the process of the development and construction of traditional Chinese villages, because of the unreasonable "out of control" management of the government, the rural areas were divided into small areas. In addition, some farmers and builders neither do have a sense of rural cultural identity and aesthetic awareness, nor do they have understanding and confidence in the value of rural historical and cultural heritage, and the phenomenon of frequent destruction of historical sites and random "protection" has led to rural traditional culture. The lack of aesthetic ability and the lack of ideology that attaches great importance to traditional culture have led to the gradual disappearance of traditional aesthetic values and rural life forms passed down from generation to generation, as well as the gradual loss of folk skills and traditional customs [5]. Due to the lack of awareness of the ecological functions and aesthetic values of rural areas, many ancient town development projects cut off the core values and aesthetic connotations rooted in the historical context of rural areas, resulting in many excessive "commercialization" and cultural "homogenization" deformed town. This will make the construction of beautiful countryside, without the dominance of local characteristic culture, make the countryside become the same and lack of its uniqueness.

The central government's "13th Five-Year Plan" proposal clearly pointed out: "carry out the improvement of the rural living environment, strengthen the protection of traditional village dwellings and historical and cultural villages and towns, and build beautiful and livable villages."

"However, the majority of urban and rural builders continue to ask." Where is the "beautiful country" and how to achieve "beautiful and livable." Western scholars generally believe that the construction of rural areas should not be limited to spatial planning, visual design, and infrastructure construction, but should correspond to the transformation of production methods. Space for consumption and conservation [6]. During the new construction cycle, if the country still uses the old agricultural master plan in this period, or simply designs the agricultural environment from the perspective of farmers' production and living needs, it will not be able to overcome the current severe agricultural problems, but will make the existing social structure, ecological balance and economic and social development of the entire agricultural area [7]. Therefore, it is necessaryfor rural leaders to understand their eagerness for natural and culturalelements in rural ecology. At present, many western countries are developingalong a special path with challenges, that is, breaking through the urban-ruraldual pattern and promote integrated and coordinated development, which is to form a new industrial urban-rural relationshipthat promotes agriculture, cities lead the countryside, industry andagriculture benefit, and urban and rural areas integrate together. In this era full of challenges andopportunities, the western ecological aesthetics theory and the Chinese ruralecological construction experiment conducted on this basis have considerablereference value for the current construction of "beautiful villages" [8].

The construction of beautiful countryside is an important focus for rural revitalization. Rural revitalization has an aesthetic value. It is necessary to recognize the aesthetic value of the countryside and regard the countryside as an aesthetic existence. In the context of the rapid development of society and the consumption of "fast food" aesthetic culture, building a rural aesthetic system in China's new rural era is to solve the problems of lack of aesthetic

awareness and weak aesthetic ability in the process of rural construction, and to establish a correct way of thinking, values and an effective way to revive the traditional rural culture.

2. Theoretical Technology

2.1. Theoretical Background. In the long historical development of our country, as well as in the development of different fine arts such as architecture, sculpture, art, music, and poetry, we can see people's requirements for beauty in aesthetic cognition and aesthetic activities, and vividly express the beauty and harmony of various periods and regions in the world. However, the crystallization of the sublimation of people's aesthetic outlook is not only pure aesthetics, but also the form of aesthetic existence in people's actual life. Chinese traditional literature mainly comes from the countryside. "Homesickness" describes people's pursuit of the beauty of the rural scenery and the simple life in the countryside. Traditional aesthetics was conceived and produced in the rural living space on the vast Chinese territory. With the gradual development and formation of rural and urban areas, people's requirements for environmental order and a better life have also been raised to a deeper level of rural aesthetics [9]. The countryside in the context of aesthetic science is an important part of the ecological system. The beauty of the countryside is a light of life, shining people on the track of sustainable development. In the world rural culture, mountain villages, with their unique natural ecological conditions and distinctive artistic characteristics, highlight the achievements of people's aesthetic innovation from ancient to modern times [10].

In recent years, with the gradual improvement of our environmental awareness and aesthetic ability of agricultural development, creating a good agricultural production environment, promoting agricultural rejuvenation, and meeting people's health and psychological requirements have been increasingly valued. "Beautiful countryside" is one of the modern construction ideas put forward by China [11]. Compared with the past, which only focused on the economic strength of rural areas to measure the development level of villages and towns, now more emphasis is placed on the transformation of rural ecological protection and the pursuit of "harmony between man and the environment." The harmonious coexistence between man and nature refers to that man and nature are a community of life and a state of sustainable development of the relationship between man and nature. One harmonious coexistence aesthetic thought, developing the "two mountains" theory of socialist rural construction in the new era is an important development concept proposed by General Secretary Xi Jinping. In order to protect the rural ecological environment and achieve green development, the planning and construction of beautiful rural areas are imperative [12].

2.2. The Connotation of Traditional Rural Aesthetics. The so-called rural aesthetics is not a very advanced, "academic" art theory, but a value recognition based on regional culture and the understanding of beauty constructed based on this value

identity. The traditional rural aesthetics has a unique aesthetic connotation. From the perspective of overall characteristics, traditional Chinese rural aesthetics often have the attributes of rural life, showing the natural features of the countryside and the beauty of farm life. When expounding the beauty of the countryside, ancient literati often described the natural scenes and social customs of the countryside through poetry, paintings, and other carriers and methods [13]. The traditional rural area also highlights the conservative and restrained aesthetic characteristics because it is far from the city center, and retains the traditional family oriented culture and rural ethics more. Therefore, traditional rural aesthetics contains a kind of beauty of farming culture, beauty of rural landscape, beauty of scholars, and beauty of rural ethics, as shown in Figure 2.

2.3. The Theoretical Connotation and Historical Process of Chinese Ruralism. Chinese tryism refers to a planning concept that reflects regional economic development, urbanization of infrastructure, and environmental landscape between cities and the countryside. The development process of Chinese ruralism can be roughly divided into three stages, as shown in Table 1, namely, ancient simple ruralism, modern ruralism, and modern new ruralism. (1) The simple rural theory in ancient China originated from the ancient Chinese society and agricultural civilization, which fully emphasized the establishment of rural economic infrastructure. The rural management methods also reflected the important role and significance of moral ethics and blood relationship in the social and political development of China. (2) The general characteristic of rural socialism in China since modern times is that agricultural development is regarded as a backward social field that needs reform. From various agricultural development experiences in the period of the Republic of China to the land reform in the period under the control of the Communist Party, how to carry out the rural revolution through agricultural reform. Activities to revitalize the countryside. 3) In the new era environment, with the change and development of rural positions and values, modern rural socialist ideas have produced various forms of rural construction practices and corresponding ideas [14].

3. Theoretical Research on the Construction of Beautiful Countryside based on Ecological Aesthetics

3.1. Understand the Logical Starting Point of Beautiful Rural Construction from the Time Dimension. Aesthetic thought is a kind of abstract understanding of beauty with strong subjectivity. It is the cohesion of people's ability to understand beauty and aesthetic evaluation ability, which integrates personal thoughts, feelings, and aesthetic preferences, and generally fully embodies the aesthetic ideal of The Times and the aesthetic temperament of society. Aesthetic thought is not only a simple thought or artistic ideology but also a thinking method integrating art, society, and humanity, with political, economic, and cultural characteristics and
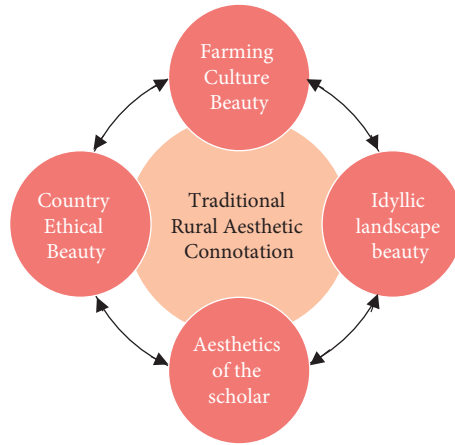
Figure 2: The connotation of traditional rural aesthetics.

Table 1: The ideological forms of contemporary neo-ruralism in China.

Form	Position	Ideological	Characteristics
Nationalist new ruralism	Dominant ideology	Back to the country's stance	Transform the countryside, promote the modernization of the country
Developmental neo-ruralism	Transition from developmentalism	From advocating industrialization, urbanization, and labor transfer of the country to accepting ruralism	Modernize
Populist new ruralism	An important force to promote the new ruralism trend	Advocate for the necessity of the existence of the smallholder economy and the social and cultural value of the village	Promoting rural development and returning to the rural standpoint
Postmodern neo-ruralism	The main driving force of the rural construction movement	Criticize industrialization, urban environmental pollution, depoliticized and romantic	Actively build "beautiful countryside"

functions. The development adjustment of China's leading rural development planning objectives and the change of the focus of academic discussions hide the logical progression of rural aesthetic development [15]. Therefore, we must return to the historical node in the past development process from the current reality based on the logic of historical development, reflect back to the present from the perspective of human development, and pursue the present and the aesthetic significance of the past and the future in the nostalgia and progress of the countryside. The logical starting point of rural aesthetics is shown in Figure 3.

Since the period of agricultural revitalization in the 1920s and 1930s and the formulation of the current national agricultural revitalization policy, China's strategic agricultural development policy has been adjusted from farmland, housing, and transportation construction to environmental governance, rural scenery protection, and leisure tourism, and so on. In 2020, China will introduce an important policy of comprehensively rejuvenating Chinese traditional culture, and the construction of "beautiful villages" will also be one of the important tasks in the integration and development of Chinese culture. Therefore, the current concept of "rural beauty" is a major demand for national policy guidance in the process of new rural construction and development. As shown in Table 2, the ecological civilization concept of the "twin mountains" theory directly explains the

important theory of contemporary American Rural aesthetics [16].

3.2. The Extension of Multidisciplinary Theory in the Construction of Beautiful Rural Environment. Through the discussion in the last part, we can realize the process of rural aesthetic theory in the construction of a beautiful countryside. However, rural aesthetic theory is not a field worth exploring, and it is a multidisciplinary complex. Rural renewal is a major global issue. It should be the main component of the theoretical research on environmental protection art, natural art, landscape art, community art, economic art, engineering art, and settlement art, as shown in Figure 4. Ecological aesthetics is an important aesthetic theoretical basis for the construction of rural ecological civilization, and the proposal of rural aesthetics is an extension of ecological aesthetics research in the dimension of rural areas. The core principles of ecological holism he proposed laid the foundation for the ecological holistic macro vision and way of thinking for the construction of ecological civilization.

In the field of ecological aesthetics, Mr. Zeng proposed "ecological ontology aesthetics." Under the great historical background of the vigorous development of China's rural art, China's rural development should be guided by the
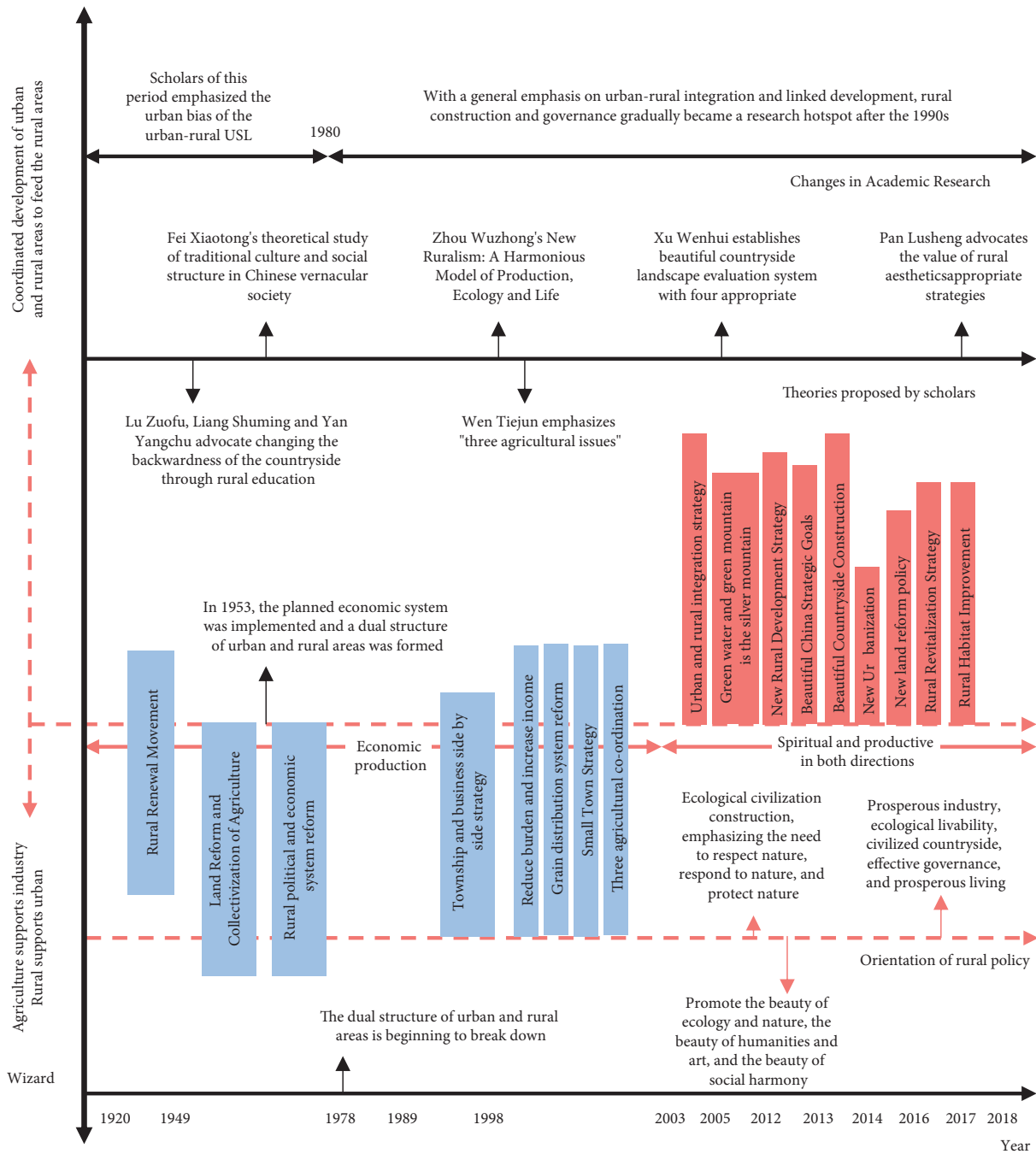
Figure 3: The diachronic analysis of rural policy development and theoretical orientation.

development of China's rural art from the perspective of ecological aesthetics, explore the overall aesthetic relationship between people and rural areas, and change the current non aesthetic problems in rural areas so as to achieve the aesthetic and living state of people and rural areas in accordance with the ecological laws [17]. It is a dynamically balanced, harmonious, and healthy rural aesthetic concept that one's urban and rural development develops under the natural aesthetic conditions, and contains the ultimate concern for people's future destiny.

3.3. Basic Elements and Structural Analysis of Beautiful Rural Construction. A village is a complex composed of natural basic elements such as mountains, fields, and rivers, artificial environmental elements such as buildings, roads, environmental sketches, and squares, and human environmental elements such as concepts, beliefs, and cultural relics. "The consistency of human and material nature (cosmic level)," is which the objective material elements and human aesthetic subjective feelings jointly constitute the basic elements of rural beauty, and are the most important component of

TABLE 2: Development of relevant rural policies in recent years.

Policy content	Focus	Policy source	Time
"Beautiful village"	Ecological construction, protect environment, comprehensive governance	"The Central Committee of the Communist Party of China and the State Council on Accelerating the Development of Modern Agriculture to further enhance the vitality of rural development Opinions," "Central No. 1 Document"	Year 2013
New urbanization	Renovating the living environment	"National New Urbanization Plan (2014–2020)year)"	Year 2014
Construction of ecological civilization	Respect for nature, conform to nature, protect nature	"The Central Committee of the Communist Party of China and the State Council on Accelerating the Promotion of Ecological, Opinions on Civilization Construction"	Year 2015
Pastoral complex	Modern agriculture, leisure travel pastoral community	Highlight measures for the development of new rural industries, "Central No. 1 Document"	Year 2017
Rural revitalization	Prosperous industry, ecologically livable, rural culture, and effective governance rich life	The report of the 19th national congress of the communist party of China, the central committee of the communist party of China	Year 2017
		The central committee of the communist party of China and the state council issued the "Strategic Plan for Rural Revitalization (2018–2022)"	Year 2018
Rural living environment improvement	Building beautiful and livable villages	"Three-Year Action Plan for Rural Living Environment Improvement"	Year 2018
Integrate into production and life	Strengthen "beautiful countryside," cultural construction	"Opinions on Implementing the Project of Inheritance and Development of Chinese Excellent Traditional Culture"	Year 2019
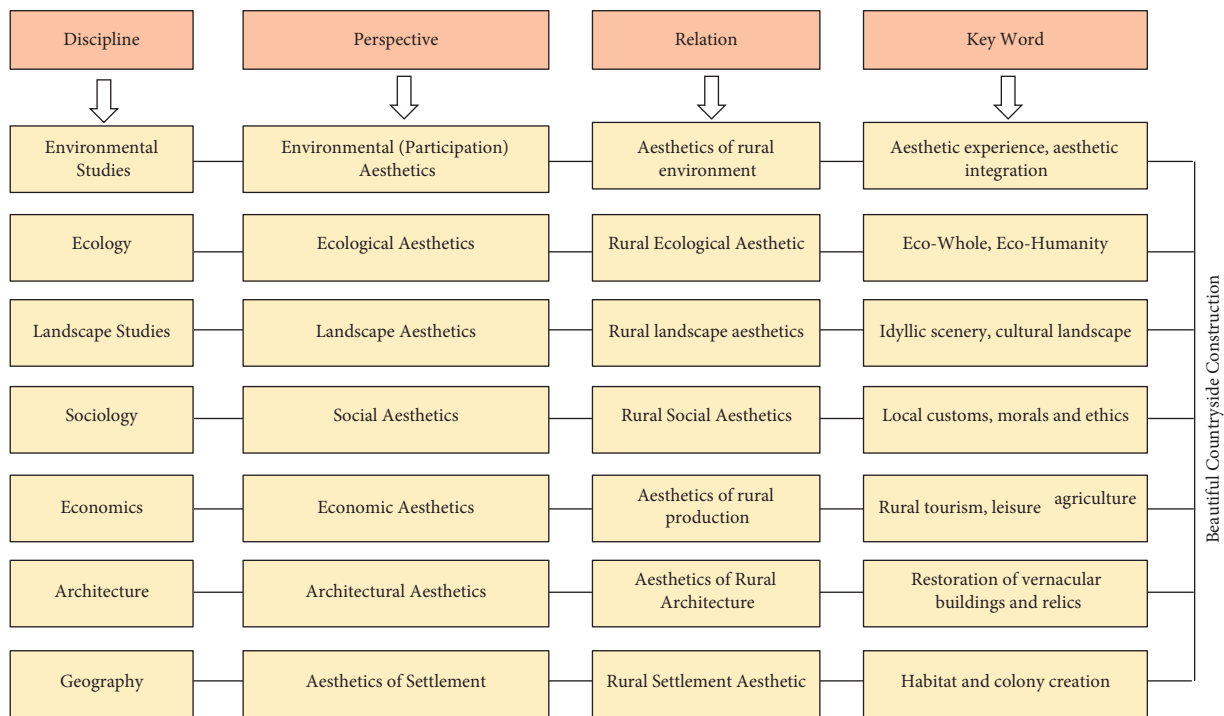
FIGURE 4: The extension of multidisciplinary theory in the construction of a beautiful rural environment.

building a beautiful rural area [18]. In order to promote the effective implementation of the rural revitalization policy and better guide and promote the construction of beautiful villages in China, China has also issued the evaluation of beautiful rural development, as shown in Figure 5.

Under the background of the establishment of the evaluation index system of "beautiful countryside" planning and construction, the elements of contemporary rural aesthetics are extracted and summarized, and the aesthetic factors such as the sky, the landscape, the vegetation, the texture, the streets, the roads, the buildings, and the public services of the countryside are passed through a certain aesthetic method. By integrating with the effect, Table 3 shows the road construction in each region of the country in
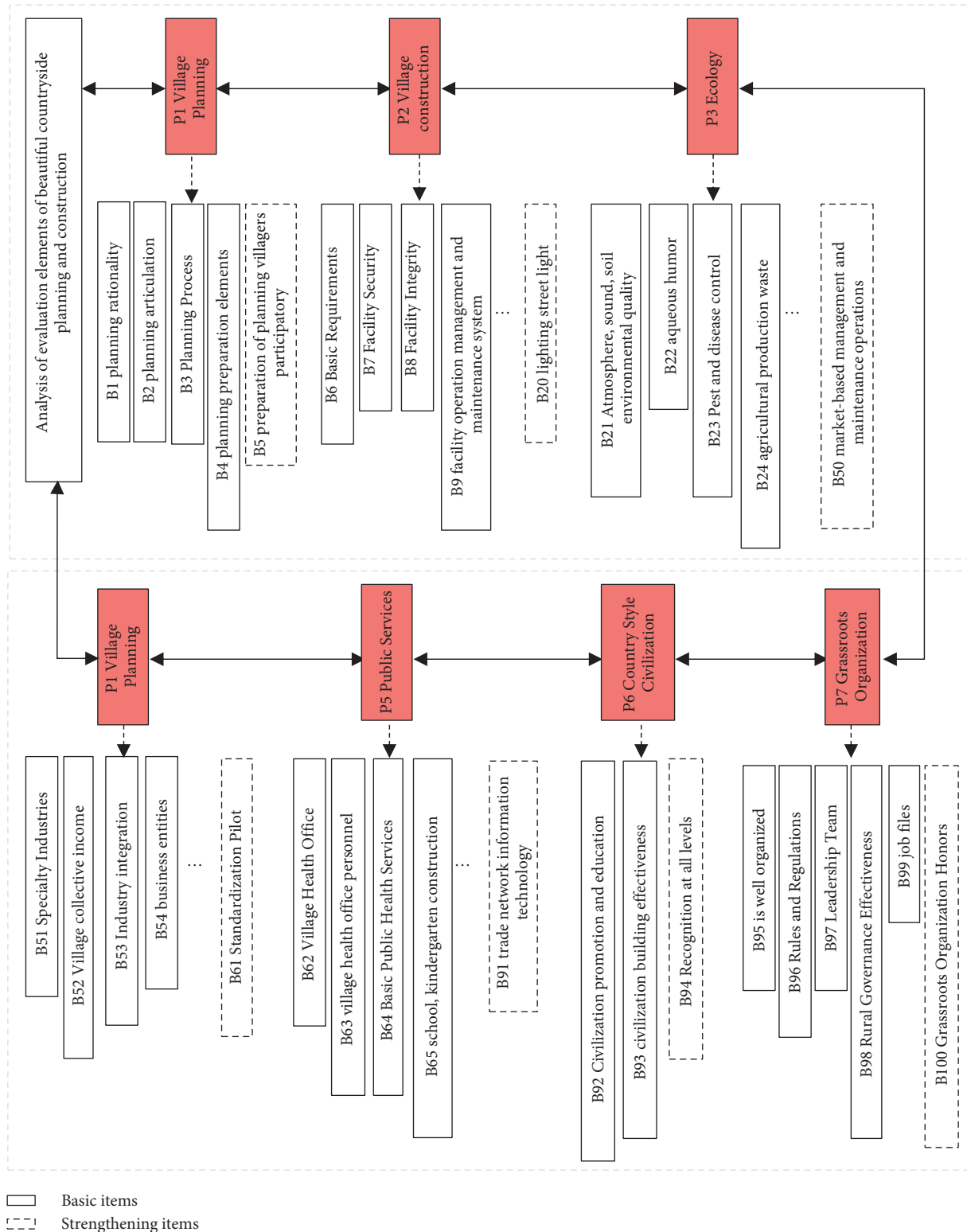
FIGURE 5: Analysis of evaluation elements for the construction of "beautiful countryside."

the construction of beautiful villages [19]. Based on this, establishing and refining the evaluation content and evaluation standards of contemporary rural aesthetics will help to further deepen and improve the beautiful rural evaluation system. By strengthening the rural core elements and softening the rural boundary elements, the structural optimization method protects the rural characteristics from being homogenized by the city, and the outer edge of the rural area is more open so that the rural area can achieve sustainable development in the new urban-rural integration

TABLE 3: The average proportion of road construction in the national beautiful rural construction /%.

Road type	Area	Fully hardened (asphalt/ asphalt, cement)	Semihardened (gravel, gravel)	Unhardened (plain soil)
Farmland roads with a width of more than 3 m	Northeast, inner Mongolia	40.5	20.6	36.8
	North China	34.9	17.2	40.0
	East China	52.2	23.5	22.7
	Central China and south China	36.7	9.1	50.0
	Northwest, southwest	35.5	12.0	47.6
Farmland roads with a width of less than 3 m	Northeast, inner Mongolia	22.5	25.3	51.8
	North China	32.8	16.1	50.6
	East China	50.9	20.8	27.6
	Central China and south China	30.3	11.2	58.5
	Northwest, Southwest	20.5	16.3	61.6

relationship. Therefore, the exploration and integration of contemporary rural aesthetic elements can also improve the basic elements of rural areas, reduce the marginal factors, thus enhancing the cohesion of rural areas and promoting the common growth of urban and rural areas.

3.4. Reconstruction of the Structural Frame of Aesthetic Space in the Construction of Beautiful Rural Environment. The aesthetic structure of the countryside includes the aesthetic theme and aesthetic object in the countryside, and has a unique aesthetic structure and aesthetic realm. In reality, the theme and object of aesthetics are related to each other, and they are consistent in the perceptual world, raising the freedom and comfort beyond practicality and utility to the height of image. Therefore, the structure of rural aesthetic space is not only confined to the biological form, but also has a deeper spiritual foundation and spiritual characteristics. Therefore, the structural framework of rural aesthetic space must have a structural framework and characteristics that are connected and supported by three levels: material structure, spiritual structure and spiritual structure, as shown in Figure 6. The material structure space includes the materialized space composed of the contemporary rural aesthetic requirements and the traditional aesthetic forms; the human space structure includes the spiritual space structure composed of policy system, cultural and educational content, social values and aesthetic taste; the psychological structure is produced in the process of determining and evaluating the value of aesthetic space and artistic conception space in rural areas [20].

4. The Predicament of "Beautiful Countryside" Environmental Design and the Enlightenment of Western Ecological Aesthetics to Environmental Design

4.1. Analysis of the Predicament of "Beautiful Countryside" Environmental Design

4.1.1. Emphasis on Economic Development and Light on Aesthetic Design. China's current urban construction policy

objective is "applicable, economic, green and beautiful." Although this policy fully considers the requirements of urban ecology and aesthetics, in the practical operation of urban and rural construction, it often pays more attention to application and economy, and sometimes even is applied. It is divided and even opposed to economy, green, and aesthetics. At the same time, the research on the beautiful countryside in China is mainly rooted in the fields of economic and social development, public management, and urban and rural planning, while less attention is paid to the creation of aesthetic characteristics of rural landscape. However, if rural beauty has no aesthetic value, what is the word "beautiful"

4.1.2. Emphasis on the City and Less on the Countryside. In the process of China's high-speed urbanization, there are also regional differences and urban-rural differences in different degrees. The development, vitality, and attraction of many villages are not enough. Many middle-aged and young people prefer to leave their hometown and go to the city. The countryside has become a forgotten corner for the left behind children and the elderly. In addition, the state and society are more inclined to preferential policies for urban construction than focusing on the optimization of rural construction. To find effective means and methods to shorten the distance between urban and rural construction in China, we cannot bypass the natural function and artistic value of rural ecology, so that all farmers can feel the beautiful environment. The harmonious rural atmosphere makes everyone's nostalgia become "beautiful" nostalgia.

4.1.3. Emphasis on Short-Term Interests over Sustainable Development. Under the above dilemmas, the report of the 18th National Congress of the Communist Party of China clearly pointed out: "Strive to build a beautiful China and realize the sustainable development of the Chinese nation." Build a powerful modern socialist country that is prosperous, strong, democratic, culturally advanced, harmonious, and beautiful. General Secretary Xi also put forward the leading idea of "lucid waters and lush mountains are
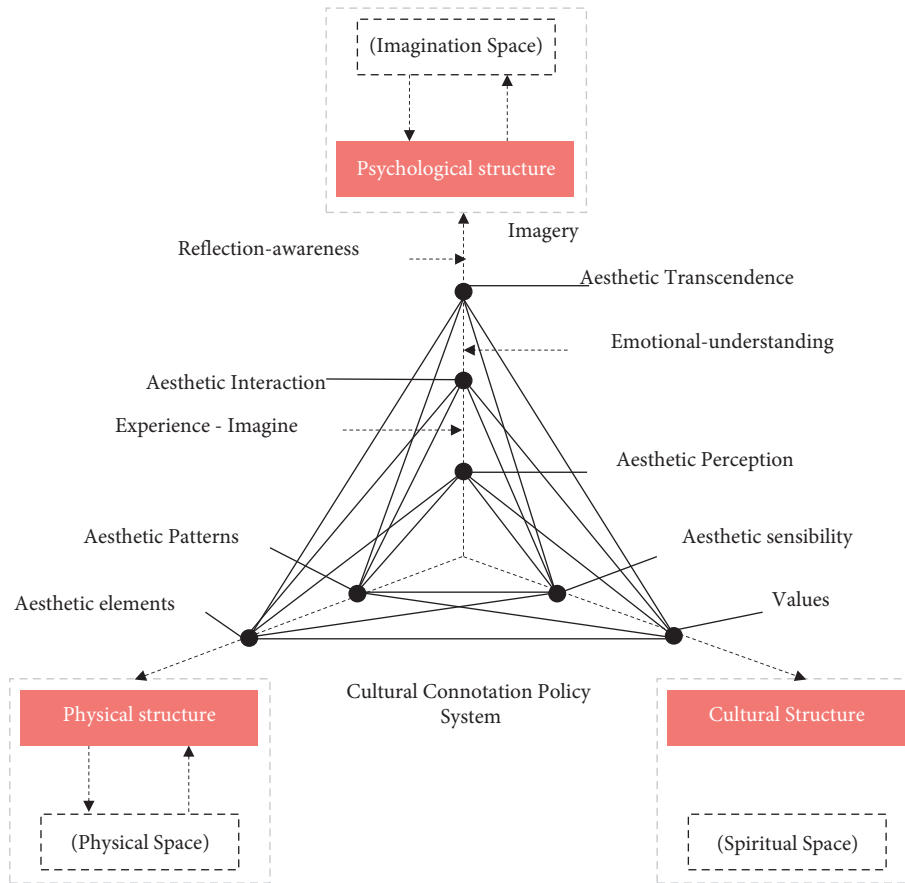
FIGURE 6: Aesthetic space structure framework system for beautiful rural construction.

invaluable assets," which shows the determination of the Chinese government to attach importance to sustainable development and the development of ecological civilization, and also points out the leading direction for "beautiful villages."

4.2. Enlightenment of Western Ecological Aesthetics to the Environmental Design of "Beautiful Countryside" in China

4.2.1. Inspiration from Deep Ecology. Deep ecology is the most important school in contemporary western radical environmentalism. Its emergence can be seen as the transformation from shallow environmental consciousness and environmental movement to deeper environmental movement. Therefore, environmental science is not simply a natural science but belongs to the field of ethics. However, because the traditional philosophy of Western Europe pays more attention to the separation between man and nature, science and technology and value, and deals with nature in a more objective and mechanized way, and even advocates that "man has the determination to conquer nature," this also makes the industrial society of Western Europe believe that science and technology can deal with existing ecological problems. Therefore, the Western European ecological philosophy is based on the contemporary ecological ontology technology philosophy, and the deep environment is

the most influential philosophical framework in this philosophical framework. Deep ecologists, mainly Norwegian thinker NAIS, attacked anthropocentrism in terms of morality, experience, reality, logic, and theory. The highest level of deep ecology is the "self-realization" of harmonious coexistence with all life, that is, human beings can realize their self-worth only when they are integrated into the relationship between the human community and the terrestrial community.

4.2.2. Enlightenment of Ecological Aesthetics. Although "beauty" is an emotional cognition and lacks a unified moral and philosophical rational criterion and conclusion, from ancient times to now, "beauty" has always been respected by everyone along with "truth" and "good." Because people's feeling system is closely related to thinking and emotion, it shows that "beauty" is affinity and integrity, and has the characteristics of natural integrity, diversity, and coexistence. Moreover, Foucault also reminded people that "thinking is not limited to the experience of the thinking subject or the expression of subjective thinking in the discourse, it is an action and practice." Ecological aesthetics is a practical philosophy that explores the aesthetic relationship from the ecological perspective, and attaches importance to the ecological aesthetic relationship between man and nature, social relationship and ontology. Ecological aesthetics

refers to people's aesthetic reflection on their own living conditions and the description of the aesthetic process of the ecological environment. "The beauty of existence" is a main content of ecological aesthetics. "The beauty of life" is a new type of natural ontological beauty but also a kind of beauty that is friendly to the environment and responsible to people. Its application can provide vitality for rural environmental construction. This has been confirmed in the history of rural development in European and American countries. Therefore, ecological aesthetics can also guide China to be more diversified and efficient in the construction of "socialist ecological civilization," and solve the environmental protection problems in the rural development of China to a certain extent.

4.2.3. Enlightenment from the Relationship between Man and Land behind Ecological Aesthetics. The fundamental essence of "beauty" in "beautiful countryside" is man and nature. Therefore, the first issue that ecological aesthetics should deal with is the relationship between man and land. It is no longer like traditional Chinese art, which puts the aesthetic theme, that is, people, in the first place. Instead, it attaches importance to the aesthetic relationship with people and society, pays aesthetic attention to the ecological environment between people and nature, and advocates the harmonious coexistence between people and nature and society. And take interest as the starting point to explore the essence of beauty. Promote the use of scientific ecological principles in environmental design and management that have a direct impact on animal and human habitats. The study of landscape ecological art in the West has highlighted the dual goals of visual beauty and ecological sustainability of habitats, and these two goals often affect each other. The best choice for conflict. The experience of western environmental art and architectural design has provided people with correct blueprints and lessons, and has a considerable impact on the design practice of China's beautiful countryside.

5. Conclusion

Starting from the idea of building a beautiful countryside, this paper argues that the rural ecological construction based on aesthetic theory is a new concept that conforms to the development of urban and rural culture, including rural ecology, industry, people's livelihood, and humanities. The current rural aesthetic theory system needs to be dialectically enriched and integrated on the soil of the core of Chinese traditional humanities, so as to establish a new concept paradigm that not only takes care of the planning and construction of a beautiful rural area but also can carry the most aesthetic elements of Chinese rural areas. The content involves the rural ecological landscape, the new life mode of agriculture, the traditional humanistic ethics of Chinese rural areas, and the aesthetic symbols of Chinese rural areas. Rural aesthetics is the main driving force to realize the harmonious construction of the current urban system. It is an effective way to effectively promote rural construction

along a reasonable direction and form a complete and adaptive rural aesthetic concept.

Today, the function of traditional rural areas has long ceased. Western Rural builders generally believe that this should be closely related to various human factors, such as emerging social needs, environmental equity, identity recognition, cultural heritage, and community equality. Therefore, the factors to be considered by China Rural Environmental Design Institute Co., Ltd. should be multidimensional, systematic, and comprehensive. The western ecological aesthetics theory has laid a certain theoretical foundation for the environmental design of beautiful urban and rural areas in China, and has made certain expansion and corresponding supplement to the existing theories. In addition, the design planning and evaluation methods affected by this environment can also bring some enlightenment and reference to the exploration of a reasonable way of environmental protection design for "beautiful villages" in China so that the vast number of rural builders can explore the design planning and environmental protection aesthetics that meet the national conditions of China.

Data Availability

The labeled dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Hindawi

Research Article

Analysis of the Coordination Relationship between the Green Principle of Civil Law and Environmental Law in Environmental Pollution and Ecological Destruction

HuiJie Chai (ORCID)

Henan Police College, Zhengzhou 450046, China

Correspondence should be addressed to HuiJie Chai; chj@hnp.edu.cn

Under the dual influence of environmental pollution and ecological damage, the green principles of civil law and environmental law can be better coordinated and developed. In the past, environmental pollution and ecological damage in the author's country were very serious. Hence, they designed and experimented with data extraction technology and environmental big data sets. A distribution model investigates it. Experiments show the following: (1) The system is developed from big data and can fully reflect the ecological environment of all parts of the country. Finally, it is concluded that the author's country's environmental pollution and ecological damage are very serious. (2) According to the experimental data of the figures and tables, it is concluded that the cooperation and coordination relationship between the green principles of civil law and environmental law not only has a protective effect on the ecological environment but also increases the economy of society and people. With the continuous updating and coordination of environmental laws and green prototypes, the author's country's environmental pollutants are significantly declining. The author believes that in the future, the country's ecological environment will become better, and the green principles of civil law will be more closely related to environmental law. The country's environmental pollution and people's lives are becoming more closely related. To better solve environmental problems, we have introduced the green principles of civil law and environmental law. It makes people's quality of life and the economy better. The main significance of the study is to use the method with the least damage to the environment to obtain the maximum economic benefit to achieve long-term sustainable development.

1. Introduction

This article illustrates that although antibiotics are therapeutic drugs for human beings, they are one of the important environmental pollutants. When antibiotics are applied to the human environment and agriculture, it is very likely that there are antibiotics that pollute the environment or antibiotic genes that produce antibodies in their residues. Their appearance has seriously affected the ecological environment of the microbiome in nature. The affected microorganisms are attached to the bodies of plants and animals, and they will soon pollute the natural environment and human environment [1]. This article describes the serious environmental pollution caused by industrial factors in Silesia, which leads to a very high probability of cancer and poor

fertility in the region. Aromatic compounds on DNA and chromosomal mutations increase the risk of cancer and proliferation [2]. The article describes the prevalence of poor people who tend to live in areas with high levels of environmental pollution and environmental inequalities that affect human health and exacerbate epidemiological confounding factors. To investigate the impact of environmental pollution on people, we conducted research on different levels of environmental pollution in England. The results show that different pollutants bring different diseases to people, and the environmental pollution in rural and urban areas is very different [3]. This article describes the current situation and trend of environmental pollution in China. Although China is trying its best to control the air and water quality in cities, the environmental pollution problems in

cities have not been improved much. China's sulfur emissions and nitrogen oxide emissions are rapidly increasing, however, CO_2 emissions are taking the route of slowing down. Finally, the form of environmental pollution in China has always been very serious, and the future development of China will still depend on the road of industrialization [4]. This article introduces the problem of ecological damage caused by the combined water discharge and conducts water quality ecological surveys on rivers, such as the Odenwald and the Rhine Valley in southern Hesse, and it briefly discusses the follow-up of water quality ecology [5]. This article introduces that a lot of human and material resources are inseparable from the ocean area. People reclaim the sea at tidal and shallow sea locations to obtain more useful land area, however, this approach will seriously damage the coastal ecosystem, Therefore, an environmental economic model is constructed to analyze the damage caused by reclamation to the ecological environment, evaluate the value of marine space as a factor of production, and ensure the sustainable development of marine resources [6]. This article enumerates the damage to the original ecosystem caused by the introduction of foreign fish into the inland waters of Kenya. Although the introduction of new species will bring new economic benefits to the local area, it will not affect the carp in the waters and the lungs of Lake Baringo. The fish ecosystem is seriously damaged, and it is also a new challenge for the new economic trading system. How to balance the ecological damage and economic benefits has become the most important factor at present [7]. This article describes the serious pollution of the marine ecological environment caused by the oil spill in the Bohai Sea, which brings us a warning. To this end, the author's country has conducted a specific analysis of the existing laws and regulations on ecosystem damage, discussed the redefinition of marine ecological damage and the severity of penalties, put forward new suggestions, and improved the country's marine ecological damage laws [8]. To better investigate this article about biological invasions that can destroy local ecosystems and global biodiversity, the authors searched the Web of Science database to find information in the fields of entomology, agriculture, plant science, and ecology. The researchers have published articles covering biological control, risk assessment, weed control, pest control, and biological invasions and climate change in agricultural production. Based on these results, it is clear that more research is needed in Asia, especially in China. In addition, the impact of climate change on the characteristics of invasive species and the ecological destruction of invasive species ecosystems should be of greater interest in the future [9]. This article describes that to adapt to the green principles of the civil law, we use LID to reduce damage to the environment. Focusing on the balance between the environment and pollutants, LID will retain the water quality conditions of the development before design, and elements are retained in the design and planning. In addition to economic problems, LID also solves most of the environmental problems in the development process. The development system is currently the main promotion of the environmental protection law [10]. This article wants to

fundamentally realize the green principle. For this reason, the green probability and principle of Anastas, Winterton, and Tang are cited to analyze the perfect solution, however, their green principle cannot clearly reflect the relationship between green and development, which also shows that these probabilities are not applicable, and there is still a long way to go in the optimization of economic benefits, effective mass yield, and green evaluation indicators around the green principle [11]. This article expounds the integration between green principles and humanization, analyzes the disadvantages of today's green products, integrates humanized design into the concept of green principles, enriches the content of environmental design, and expands the concept of environmental design. We strive to find the best combination of humanized thinking and green design, create a more complete framework for the green design strategy system itself, and implement the green concept into the entire product life cycle under the guidance of humanized thinking. Creative products promote the harmonious development of the environment [12]. This article mainly discusses the reasons why the author's country's environmental law has no effect on people. To see the current situation of the country's environmental law, the authors designed and established a system and historical background to give an overview of the environmental law, and finally, they came to the conclusion of China's environmental law. Deficiencies and concerns with respect to law enforcement tensions in the central and outer regions have been a major impediment to operations because of decentralization and increased regional protection [13]. This article describes the failure to achieve effective enforcement because of the continuous formulation and frequent revision of environmental laws in the country. The reason is due to the lack of legislative technology. Compared with many environmental laws and regulations, environmental standards are technical standards, and social reality has scientific and technological characteristics. Therefore, scientific progress can improve our understanding of environmental law causality. Technological advances can also update legal information and broaden the scope of legal solutions [14]. This article addresses the significant problem with environmental law that there is no information on the relevant public health and environmental impacts of industrial activities. Current laws do not counteract the conduct by not assessing the potential harm of their activities and by punishing them for doing so as a rule. It is the natural tendency of people to remain silent about the harm they can cause. Finally, some specific suggestions are given to reverse the impact of these unfavorable factors on the environmental law [15].

2. Environmental Law Analysis

2.1. Definition of Environmental Law. Environmental law is a general term for laws implemented in the country to protect the ecological environment and nature and reduce pollution and other harmful substances. The object of environmental protection is the land of the Chinese people, mainly soil, air, water quality, wetlands, grasslands, mineral resources, many natural environments, and so on. It includes man-made

habitats, i.e., man-made environments, such as canals, reservoirs, plantations, historic sites, towns, and other settlements. The role of environmental law is to socially and economically divide the various social relationships involved in environmental protection and improvement created by people (including organizations) in production, livelihoods, and other reconciliation activities. It is to reconcile the relationship between social development and environmental protection. We must minimize pollution and environmental damage, balance the ecosystem, and complete the perfect integration of our people and the environment. There are two kinds of social relations in environmental law, one of which involves many relations related to the protection of natural resources, chemical pollutants, various wastes generated in life, and protection against harmful substances, such as garbage and noise. It is not difficult to understand that the environmental law is different from the emission control law, and titles, such as the emission control law, are limited to pollution prevention and management.

2.2. The Main Content of Environmental Law.

The content of environmental law is very extensive, it includes the constitution and the comprehensive environmental protection law , which stipulates that protecting the environment and utilizing natural resources is the responsibility of all government departments, companies, and people. Achieve environmental goals together. According to the Greek constitution, the protection of the natural and cultural environment is the responsibility of the state. The constitution of the German Democratic Republic stipulates that the state and society, for the benefit of citizens, must do everything possible to protect nature, keep water and air clean, and keep the survival of animals and plants. It is also the duty of every person. Implement planned environmental management and incorporate environmental protection into social and economic development goals. The Soviet Union and Eastern Europe regard environmental protection as an integral part of their economic and social development plans, and maintaining environmental protection is also a top priority. Governments at the national and local levels should take necessary measures by taking it into account and seriously implement plans to avoid environmental pollution. Establish an environmental impact assessment system. The system requires authorities, companies, and institutions, as well as citizens, in the case of activities that have a significant impact on the quality of the environment to collect and study the natural and social conditions around them in advance and submit a written report. In principle, the polluter pays. The principle is that if the pollution affects it, the victim must be compensated and must bear the cost of cleaning up the consequences of the pollution. The pollutant discharge tax system and part of the pollutant discharge tax system are specific measures to implement the polluter-pays principle. The state provides financial information and tax incentives for environmental protection, environmental research, environmental scientific research, and other activities. In accordance with the requirements of the Japanese law, the government has adopted necessary fiscal and taxation policies, encouraged enterprises to build and improve pollution prevention facilities, and granted special benefits to small and medium-sized enterprises. Property tax exemption for environmental protection facilities tax exemption for land purchase, relocation to densely populated areas, etc. Illegal acts that threaten the environment shall be investigated for administrative, civil, and criminal responsibilities. There is a growing trend towards fulfilling this responsibility. For example, if damage is caused to human life, health, or property within the scope of damages caused by the discharge of substances harmful to the environment or health, the person responsible for the discharge will be liable for damages without negligence. In cases where criminal responsibility is pursued, the scope of responsibility has been expanded and penalties have been increased (in particular, increased penalties and longer sentences). According to the relevant laws of the Federal Republic of Germany, environmental crimes are punished on a 10-year basis. The burden of proof is in the plaintiff's favor and in the defendant's favor. The central government exercises an overall leadership in environmental work, and it has established special government environmental management agencies, such as the US Environmental Protection Agency, the Japanese Environmental Protection Agency, and the Environmental Protection Agency. Countries, such as the Soviet Union and Côte d'Ivoire, stipulate that environmental management must be carried out by corresponding institutions. All countries in the commercial sector emphasize and require local governments to be responsible for environmental protection work in their regions, and they will establish functional environmental management institutions. The content of environmental law is mainly to prevent environmental pollution and protect the environment and natural resources.

2.3. The Emergence and Development of Environmental Law.

The environmental problems of human society a long time ago were because of the damage to the natural environment caused by agricultural activities. Later, with the vigorous development of the industrial market, industrial pollution started to occur. Some countries have taken partial measures since the mid-19th century. The British Alkali Industry Act (1863), River Pollution Control Act (1876), Public Health (Food) Act (1907), River and Port Act (1910), and the French Air and Air Pollution Act No.48-400 have enacted corresponding laws to protect nature. For example, France, Austria, and Russia have developed a relatively complete forest protection legislation since the beginning of the 19th century. The rapid development of the environmental law began in the 1950s and 1960s. The balance between natural resources and the destruction of ecosystems is getting worse. This would be a catastrophic pollution, and effective measures for environmental management include a formal set of environmental laws. It has grown into a new, independent legal institution.

2.4. Legal System.

Today, in many industrially developed countries, the environmental law is already perfect, and it is an integral part of national law. The environmental law generally includes several aspects, such as legal provisions on environmental protection and environmental pollution.

There are now environmental protection clauses in the constitutions of many countries. It is the highest standard and legal basis for state and social protection activities. There are regulations on the protection of land, minerals, grasslands, rivers, lakes, atmosphere, animals, plants, and natural environment, including regulations on the protection of nature reserves, historical sites, and national parks. Law and regulations for that prevention and control of air and wat pollution, noise and vibration, sedimentation, pollution, and other public hazards, including the prevention and control of odor and thermal pollution, the disposal of wastes, the management and control of pesticide, and other hazardous chemicals, and the prevention and control measures for radioactivity and electromagnetic radiation are provided. Different levels of environmental and hazardous conditions such as high water and high air levels involve legal protection issues. It emphasizes the establishment of legal liability, dispute and environmental system levels and various management methods, administrative law, criminal law, civil law, commercial law, labor law, and other environmental protection laws. In addition, some capitalist countries also include relevant judicial precedents.

2.5. Characteristics of Environmental Law. According to other jurisdictions, the environmental law, as an independent judicial body, has the following characteristics: environmental protection is the broad protection of the environment. The environmental law is not just an environmental law as it includes the constitution, environmental protection, criminal law, labor law, commercial law, and other laws. We must use scientific, engineering, and economic methods. The environmental law is closely related to the above methods. Therefore, the environmental law has many technical requirements. The environmental law is limited by economic and social systems. There are also laws targeting the natural ecology to protect natural environments, such as soil, air, water, and forests. As a legal branch, the environmental law expresses the will of the ruling class and contributes to its interests. However, it also adapts to different levels of social and national interests. The global environment in which human beings live is everything. Environmental problems are faced by all people, and we can learn from each other from the environmental laws of different countries.

3. Research on the Detection Method of Environmental Pollution and Ecological Damage

3.1. Environmental Pollution and Ecological Damage Emergency Risk Index Sampling. To accurately identify pollution and environmental hazards, the pollution control index is becoming a comprehensive technology for retrieving and disseminating information and protecting the environment. Big data and environmental risk index are used to establish an emergency pollution risk index model for environmental pollution and ecological damage. The correlation check and fuzzy clustering method are used to detect the emergency

risk index of environmental pollution and ecological damage. Based on the risk index of data clustering model, the time-frequency distribution of emergency risk index of environmental pollution and ecological destruction is studied.

For the detection of environmental pollution and ecological damage emergency risk index, the correlation check, fuzzy clustering method, and filtering algorithm are used. The filtering algorithm can improve the environmental pollution detection ability and the emergency risk index. It fixes a linear kernel function to perform a set of rough set feature extraction, redundant filtering, and interference elimination on the extracted rough integrated features, and finally, the system also has the function of self-retrieval and error repair, which makes the research results of the system more reliable, thus realizing the algorithm and technology, which is of great help to the research on environmental pollution and ecological damage.

$$p(t, f) = \int_{-\infty}^{\infty} s\left(u + \frac{\tau}{2}\right) s^*\left(u - \frac{\tau}{2}\right) \alpha(\tau, v) \tag{1}$$

$$\cdot e^{-j2\pi(vt + f\tau - vu)} du\, dv\, d\tau,$$

$$\gamma(h) = \frac{1}{2} E[Z(x) - Z(x + h)]^2. \tag{2}$$

The elements of risk index association rules are decomposed into time intervals, and the sample window is processed by feature selection and merging $n \in [n_1, n_2]$ assuming that the two points are n_1 and n_2, respectively. The distance between the two points is designed to be normally distributed, and the statistical characteristics of the environmental pollution and ecological damage emergency risk index extracted from the existing framework can be calculated by the frequency estimation method to calculate the pollution response rate for statistical analysis. The formula for the sample value between the two points in the primary risk index is as follows:

$$\hat{w}(n) = \arg\min_{k(n)\in k}\left[\sum_{n=n_1}^{n_2} g(k(n)), k(n+1) + \sum_{n=n_1}^{n_2} fWVD(n, k(n))\right], \tag{3}$$

$p(k(n); n_1, n_2)$. We have obtained the subsequent summary and treatment methods to successfully achieve the normalized adjustment of the emergency risk index of environmental pollution and ecological damage.

$$m_i(d_l) = \frac{\xi_{c_i}^{d_l}}{2\sum_{l=1}^{k} \xi_{c_i}^{d_l} - 1}, \tag{4}$$

$$m_i(\Theta) = \frac{\sum_{l=1}^{k} \xi_{c_i}^{d_l} - 1}{2\sum_{l=1}^{k} \xi_{c_i}^{d_l} - 1}. \tag{5}$$

Formula (4) and formula (5) are the unified treatment of the emergency risk index of environmental pollution and ecological damage. Its purpose is to make the data better search, calculate, and reduce the time consumed by the system

running. According to these formulas, the emergency risk index of environmental pollution and ecological destruction is analyzed, and the characteristics and correlation are explored according to the results of information sampling. Formula (4) represents the statistical summary of data in areas where the environment has been destroyed, and formula (5) is expressed as region division statistics for interference datasets. The proposal of these two formulas can make the collected environmental indicators more accurate.

where $l = 1, 2, \ldots, k$. The above formulas represent the sampling point n_1 to the sampling point n_2. The statistical value of the distribution of the emergency risk index between environmental pollution and ecological damage, defined as $k(n)g(x, y)$ and $f(x)$ the sum is in the formula $g(x, y)$ for $k(n)$. The cost function of environmental pollution and ecological damage, $g(x, y) = g(|x - y|)$ relative to $|x - y|$, is characterized by a continuous time distribution. According to the above formula, the sampling of the environmental pollution and ecological damage emergency risk index is realized, and the characteristic profile and correlation exploration are carried out according to the information sampling results.

3.2. Finding the Characteristic Quantity of Emergency Risk Index. A distribution model of emergency risk indicators for environmental pollution and ecological destruction projects is established, a rough set of emergency risk indicators is extracted, and a correlation filtering algorithm is used to perform redundant filtering on the extracted rough set features. Disturbance elimination and pollution preparation for irrigation works. The frequency domain feature analytical structure model is used in the frequency domain space, and the method of minimizing the root mean square error estimation is used to check the risk indicators, and the function is tested through experiments. It shows that the method can improve the environmental pollution detection ability and improve the risk index of emergencies, and it fixes a linear kernel function to perform a set of rough sets of feature quantity extraction. The feature extraction rough sets of environmental pollution and ecological destruction emergency risk index satisfy the target set $POS_A^*(X)$ and the target feature negative field of the model $NEG_A^*(X)$. The data of the emergency hazard index satisfies the following:

$$POS_A^*(X) = \cup \left\{ E \middle| P\left(\frac{X}{E}\right) > P(X), \frac{E \in U}{A} \right\}, \quad (6)$$

$$NEG_A^*(X) = \cup \left\{ E \middle| P\left(\frac{X}{E}\right) < P(X), \frac{E \in U}{A} \right\}, \quad (7)$$

$$BND_A^*(X) = \cup \left\{ E \middle| P\left(\frac{X}{E}\right) = P(X), \frac{E \in U}{A} \right\}, \quad (8)$$

In

$$P\left(\frac{X}{E}\right) = \frac{P(X)}{P(E)} = \frac{card(X \cap E)}{card(E)}, \quad (9)$$

$$P(X) = \frac{card(X)}{card(U)}. \quad (10)$$

$card(X)$ represents the cardinality of the tracking set X under linear kernel operations. The continuous correlation filter detection method is used to establish the implicit function D (x) of the risk index distribution of emergency environmental pollution and ecological damage. At each sampling point, each X point in the pollution risk index distribution function has weighted information. In sample E, the rough sample points of the emergency risk index of environmental pollution and ecological damage s′, s′ is the nearest adjacent sample point of environmental pollution and ecological damage emergency risk index. If $s \in E$, theNearest (E, s', s)。 is defined as follows:

$$\text{Nearest}(E, s', s) \Leftrightarrow \forall s'' \in E |s' - s| \leq |s' - s''|. \quad (11)$$

At each sampling point, each s point in the pollution risk index distribution function has weighted information. Formula (11) indicates that there are two adjacent and nearest environmental pollution and ecological damage emergency risk index sample points in sample E that satisfy them, which belong to sample E. Then, there will be another point in sample E between the maximum range of the two points, and the definition formula of the Nearest of this point can be defined as formula (11).

The credibility of the environmental pollution and ecological damage emergency risk index supervision is as follows:

$$g\left(\frac{X}{E}\right) = \frac{P(X|E)}{P(X)} - 1. \quad (12)$$

The distributed information model of environmental pollution and ecological destruction emergency risk index $S = (U, C \cup D, V, f)$ is defined. Under the condition of association rules, the environmental pollution and ecological destruction emergency risk index is scored in score domain $NEG_C^M(d)$、 boundary domain $BND_C^M(d)$, and central domain $POS_C^M(d)$. The formula is as follows:

$$POS_C^M(d) = \cup \left\{ E_i \middle| g\left(\frac{d}{E_i}\right) = \max\left(g\left(\frac{d_1}{E_i}\right), \right. \right. \quad (13)$$
$$\left. \left. \ldots, g(d_m|E_i)\right) > 0, E_i \in E \right\},$$

$$NEG_C^M(d) = \cup \left\{ E_i \middle| g(d|E_i) = \min\left(g(d_1|E_i), \right. \right. \quad (14)$$
$$\left. \left. \ldots, g(d_m|E_i)\right) < 0, E_i \in E \right\},$$

$$BND_C^M(d) = \cup \left\{ \frac{E_i}{g(d/E_i) = 0} E_i \in E \right\}. \quad (15)$$

Formula (13), formula (14), and formula (15) are the environmental pollution and ecological damage emergency risk index check score domain, boundary domain, and central domain, respectively. After adding these three formulas, very bad and excellent ecological environment can be excluded. For environmental areas, it is the same as the principle of removing the highest and lowest scores when grading the competition. We set the ecological environment inspection score within a certain range to avoid the adverse effects caused by extreme data and ensure the ecological

system calculated by the system. The environment is within the acceptable range, and it is not a common phenomenon in reality.

Finally, the Bayesian rough extraction results are obtained. In addition, adaptive planning and link extraction will be carried out according to the characterization results of the environmental pollution and ecological damage emergency risk index.

3.3. Detection Algorithm Optimization. On the basis of constructing the risk index distribution model of environmental pollution and ecological damage in emergencies, the risk index is collected, and a detection method for the risk index of emergencies pollution based on the original least square error estimation is proposed. The extracted coarse ensemble features are subjected to redundancy filtering and interference removal using a kernel-based correlation filtering algorithm. The gain function of the redundant filter is $\sum_{l=1}^{k} \max g_{ci}(d_l) \geq 1$ or $\sum_{l=1}^{k} \max g_{ci}(d_l) \leq 1$. The statistical detection feature set of the kernel correlation filter satisfies the linear transformation of the instantaneous interference frequency with time, and the exponential detection adopts a function normalization method to detect, which is as follows:

$$m_i(d_l) = \max g_{ci}(d_l), \tag{16}$$

$$m_i(\Theta) = 1 - \sum_{l=1}^{k} \max g_{ci}(d_l). \tag{17}$$

where $l = 1, 2, \ldots, k$, for $\forall A \subseteq \Theta$, Interfering with datasets Θ, there are many mass function $m_1, m_2, \ldots, m_n$ of rough set. The simple feature parameter extraction output is as follows:

$$(m_1 \oplus m_2 \oplus \cdots m_n)(A) = \frac{1}{1-K} \sum_{A_1 \cap A_2 \cdots \cap A_n = A} m_1(A_1)m_2(A_2)$$

$$\&9; \quad \cdots m_n(A_n). \tag{18}$$

In,

$$K = \sum_{A_1 \cap A_2 \cdots \cap A_n = \varnothing} m_1(A_1)m_2(A_2) \cdots m_n(A_n). \tag{19}$$

Assume various characteristic attributes of x to be taken as $D_x = 2$. Then, we can get $\xi_{c_1}^{d_2} = 3/5$, $\xi_{c_2}^{d_2} = 2/5$, $\xi_{c_3}^{d_2} = 2/5$, $\max g_{c_1}(d_2) = 6/5$, $\max g_{c_2}(d_2) = 3/8$, and $\max g_{c_2}(d_2) = 1/10$. The frequency domain characteristic decomposition structure model for creating the emergency risk index of environmental pollution and ecological damage is as follows:

$$\min imize \left(\sum_{i \in v_{w,+}} c_0^w |b_{i,0}^w + b_i^w| + \sum_{i \in v_{w,-}} c_0^w |b_{i,0}^w + b_i^w| \right), \tag{20}$$

$$\sum_{e \in \delta_{w,-}(i)} x_e^w = \sum_{e \in \delta_{w,+}(i)} x_e^w + x_i^w \forall i \in \left(V_{w,+} + UV_{w,-}\right), \tag{21}$$

$$\sum_{e \in \delta_{w,-}(i)} x_e^w = \sum_{e \in \delta_{w,+}(i)} x_e^w \forall i \in V_{w,=}, \tag{22}$$

C_0^w is the detection coefficient of the chirp, and x_e^w represents the fluctuation of the pulse part. In the 2D plane (m, n), discrete sampling is used to obtain the cluster eigenvalues of the detection output of the environmental pollution and ecological damage emergency risk indicators.

$$\omega_k = \begin{pmatrix} v_k \\ e_k \end{pmatrix} = \begin{pmatrix} x_k - f(x_{k-1}) \\ y_k - h(x_k) \end{pmatrix}. \tag{23}$$

The above process realizes the algorithm and technology, which is of great help to the improvement of environmental pollution and ecological damage. However, when the algorithm is wrong, because the system data is too large and the calculation process is too long, the system will sometimes collapse. When we introduced a new formula, the system self-checks the wrong data.

$$H(X) = p(x_1)I(x_1) + p(x_2)I(x_2) + n + p(x_n)I(x_n)$$

$$= -\sum_{i=1}^{n} p(x_i)\log_2 p(x_i), \tag{24}$$

p represents the place where the error occurred in the system, I represents the time of self-discovery of the error, and finally, the statistics obtained the possible problems. Hence, the final result was obtained from the data, and then the result was placed in a special operation model. The correct data is calculated by the system as follows:

$$\frac{\partial E}{\partial W_{jk}^{(2)}} = \frac{\partial E}{\partial_Y} * \frac{\partial X}{\partial \Sigma} * \frac{\partial \left(\sum_j \partial W_{jk}^{(2)} * h_j \right)}{\partial W_{jk}^{(2)}}$$

$$\&9; = 2\left(|y - t| * P^{(2)}\left[\sum\right] * h_j \partial W_{jk}^{(2)} \right) \tag{25}$$

$$\&9; = \partial W_{jk}^{(2)} - \alpha^* \frac{\partial E}{\partial W_{jk}^{(2)}}.$$

Formula (24) will only have an impact when there is an error in the system. It can self-check the wrong place in the system and the time of self-discovery of the error, and then, it can put the obtained error result into the special operation formula (25) for correction. At this time, the manual help of the operator is needed, and the data before the error is obtained through simple data operation.

The overall process description of the environmental pollution and ecological damage emergency risk index is as follows: (1) the linear data is obtained from the transformation domain, and the average value is 0. (2) Define the narrowband interference identifier X⟶Z. (3) Set the number of components of the pollution emergency risk index to n. Recurrence k ← 1. (4) Randomly select the initial weight vector W_k to contaminate. Weighted adaptive learning to detect key risk cues. (5) $W_k = E\{Zg(W_k^T Z)\} - E\{g'(W_k^T Z)\}W$. (6) $W_k = W_k - \sum_{j=1}^{k-1}(W_k^T W_j)W_j$. (7) $W_k = W_k / \|W_k\|$. (8) Assume that W_k does not satisfy the convergence condition, and step (5) is started. (9) Let $k =$

$k + 1\text{k} \leq n$ and start step (4); (10) The system carries out self-correction of error data; (11) end..

4. Experiments and Conclusions of Ecological Environment and Environmental Law in the Green Principle of Civil Law

4.1. The Functional Orientation of the Prereorganization System under the Guidance of the "Green Principle". Another "green principle" is to save resources, and the ultimate task is sustainable development. The "Green Principles" first appeared in the country's civil law system as Article 9 of the "General Principles of Civil Law." The traditional concept of harmony between man and nature and elegant culture reflects the new concept of development put forward at the 18th National Congress of the Communist Party of the country, and it reflects the country's densely populated national conditions. This demand has long resolved the contradiction between human ecology and resource ecology. From a judicial and economic point of view, resource protection must be understood in a broad sense. Not only as something generally accepted in court, but resource protection refers to the protection of a specific property or resource, and it is inclusive. This document adopts the interpretation of the "Green Principles" in the legal and economic sense. Prereorganization can enable enterprises to reduce the use of social and national resources, so that more economic resources can be invested in the ecological environment.

The primary goal of the bankruptcy law is to maximize the value of assets. We need to increase repayment rates for all creditors around the world and reduce the costs and liabilities of insolvency. We further recommend that to achieve this, a number of factors need to be considered. On the other hand, the value reduced by immediate liquidation of bankruptcy costs and the added value that bankruptcy reorganization can provide to creditors. Instead, assets must be preserved or improved. The amount of new investment and the cost of investment affect existing stakeholders. "Asset Maximization" aims to maximize returns on assets with low bankruptcy costs. It is a clear expression of legal and business "green principles". "Prerestructuring" refers to reducing the restructuring costs and improving restructuring efficiency by considering the value of restructuring and the viability of debt businesses. The steps for a company to develop a plan before restructuring are as follows: if the company has financial difficulties, the company's management will negotiate with major creditors and major shareholders to resolve the company's current crisis. If the out-of-court negotiations are successful, the company's bankruptcy trend will be reversed. Debt acquires self-immunity, which is essentially a personal interest, however, the main disadvantage of personal interest is the "withholding" effect. A friendly negotiation can only be effective and carried out with the consent of both parties to the negotiation. If an individual creditor or multiple creditors choose not to encourage negotiation because the recovery rate has not improved significantly, or want to exercise their rights quickly,
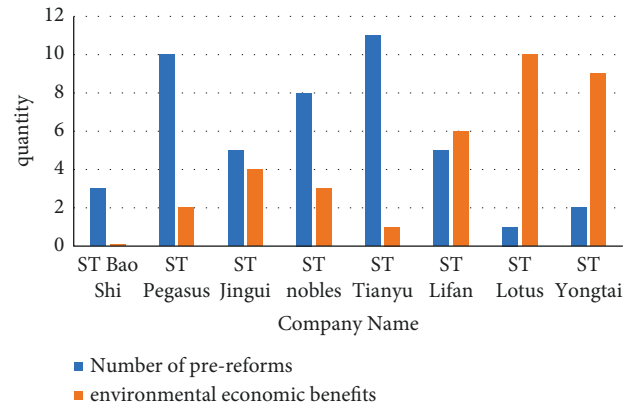
FIGURE 1: Prereformation and environmental economic links.

the settlement fails and lurks, and the victim disappears. Depending on the debtor's interests, prereorganization may provide legal enforcement to compel opposing creditors to comply with the agreement obtained. Therefore, the pre-restructuring system is a perfect combination of public and private aid. It avoids the high cost and inefficiency of public funding, a disadvantage in terms of efficiency. The pre-calibrated system ignores the specifications of the fashion calibration system. The flexible and convenient negotiation process between topics reduces the negotiation time. Reduce negotiation costs, improve negotiation efficiency, and improve reorganization efficiency. Figure 1 reflects the relationship between the number of prereorganizations of some enterprises and the ecoenvironmental economy.

There is an indirect link between the number of corporate prereorganizations and the ecological environment. The more the number of times of prereorganization, the higher the environmental and economic benefits. "Prereorganization" means that by considering the value of reorganization and the viability of the debt business, the cost of reorganization can be reduced and the efficiency of reorganization can be improved with the resource utilization of the country, so that more economic resources are put into the ecological environment. It is generally impossible to find their connection without a deep comparison between them.

4.2. Development of Environmental Law. Environmental law is very unstable, especially in the past 10 years. The revision rate of the country's environmental law has been very high. Environmental law is in disarray. Table 1 shows some of the findings from the statistical period from 2011 to 2020. There are 10 laws amended or revised in the past 10 years, with a total of 18 revisions, with an average of 1.64 revisions per law. The natural resource conservation law was revised 3 times, an average of 4 times per law.

Logically, the destruction of current environmental laws is a combination of historical time and some social factors. It will not last long if the quality of the environment improves. However, eddy current damage is difficult to eliminate in a short time. These distractions do not just complicate law enforcement. It affects the law and safety, however, it also sends a "disturbing" message of environmental law. Inspired

TABLE 1: Application of 4 laws in 2012–2020.

Legal name	2012	2013	2014	2015	2016	2017	2018	2019	2020
Air pollution prevention and control law	9	95	272	460	854	1516	2400	3194	2969
Water pollution prevention and control law	10	117	613	612	915	1655	1895	3464	2097
Circular economy promotion law	3	20	60	32	44	51	71	130	51
Cleaner production promotion law	3*	3	6	3	7	4	4	6	4

by "offensive" messages, interest groups seek to subvert media discourse. Guide public opinion, communicate relevant interests, and influence environmental legal procedures through repeated amendments to laws. Make the legal declaration that best suits one's interests. Achieving the goals of whether the environmental law is still "public" is unclear. Whether the "environmental law" can still protect the environment and avoid pollution has become a bigger problem.

Moreover, environmental law is still very complicated. Firstly, according to the legal statistics, environmental regulations account for about 10% of all laws, and environmental management regulations account for about 10% of all laws. It accounts for 7% of all prescriptions. Using the magic weapon of Peking University as the input database, there are currently 15 laws (including the Basic Law), 4 legal interpretations, 25 administrative regulations, 130 departmental regulations, and 1193 regulations in the country's current environmental protection laws. The Environmental Protection Act also includes local ordinances and Section 501 local government rules. Resource protection law rule consists of eight laws (except "protection of the marine environment"), one judicial interpretation, 20 administrative regulations, 594 local regulations, and 232 local government regulations. It is more intuitive than the previous data. Peking University's 110 legislation includes a lot of environmental protection laws. These figures reflect the environmental law. Secondly, adjusting for redundancy is important. Compliance with environmental laws is common.

Specific environmental factors are as follows: most of these environment entries go through several environment lists. Regulatory measures and governance goals are basically the same. It makes duplicate custom questions logical. For example, the groundwater natural resources and natural resources act regulates the extraction of natural resources. It includes groundwater extraction under the Water Resources Act. The two laws unwittingly overlap on regulatory issues. Of course, various environmental protection departments are also involved in comprehensive adaptation issues. Duplicate the custom question to see all the environments. Legal provisions vary. Some scholars believe that the repetition rate of various emission regulations in the environmental protection law exceeds 30%, especially in terms of performance. Pollutant discharge permits, emission standards, and equipment requirements comply with legal requirements. The author is from Peking University. Based on the legal comparison function of the miracle solution, it targets the relationship between specific environmental laws and creates the repetition probability of the graph array. Table 2 clearly demonstrates this similar phenomenon.

The author's country's environmental laws do not exist independently. They are, more or less, related. Among them, the water pollution prevention and control law has the highest repetition rate with the other four environmental laws. Among them, the other four environmental laws have the lowest repetition rate. The concluded environmental laws include pollution sources of ocean, water, soil, atmosphere, and environmental noise, and the impact between them can also have an impact on others.

4.3. Analysis of the Ecological Environment of the Country's Previous Green Principle. As humans cut down a lot of trees, many forests have disappeared from the human environment. The lush Alps became a hopeless and desolate hill. Wild animals have lost their beautiful homes. Some species have become extinct, and the scene of people living in harmony with nature reminds us of the beautiful nature. If the forests are destroyed, then the world loses its natural layer of protection. Nutrient loss from soil increases in fertile areas, land degrades, and the ability of forests to withstand dust storms decreases. Forest air pollution diseases and infectious diseases are serious threats to human life. When the forest is destroyed, the sky is not blue, the mountains are not blue, and the water is not blue. The air is no longer fresh. There will be disasters, sandstorms, and a lack of water. The unbalanced ecological environment on which human beings depend has been severely damaged. It is urgent to rebuild the beautiful mountains and rivers and treat the damaged land. In view of these situations, Table 3 is the detailed analysis of environmental pollution we have collected, which can help us solve environmental problems more clearly.

Environmental pollution: although there are many kinds of environments, the way their pollutants are transferred to the environment are basically through the atmosphere, groundwater, plants, and soil. Therefore, if we want to solve environmental problems at this time, we can start from these four aspects. For the atmosphere, we can research and develop new products to purify air quality faster. Increase the control of groundwater discharge in the country, and set relevant laws and regulations to restrict people's behavior; in addition, plant more green plants that are beneficial to environmental protection.

Among them, the successful blockade of vegetation in dense forests can distribute rainfall. The rainfall intensity is greatly reduced, and the raindrops do not directly affect the land, absorb, nourish, and flow into the river, and they do not pollute the river. The water of the river is clear and blue, and the water quality is good. Because of the impact of human economic activities, the soil has lost its protection for

TABLE 2: Partial duplication rate of provisions of environmental laws.

Legal name	Environmental protection law	Marine environmental protection law	Water pollution prevention and control law	Soil pollution prevention and control law	Air pollution prevention and control law
Environmental protection law	0	27.4	27.7	28.7	25.4
Marine environmental protection law	27.4	0	27.8	21.2	21.6
Water pollution prevention and control law	27.7	27.8	0	25.5	33.0
Soil pollution prevention and control law	28.7	21.2	25.5	0	26.2
Air pollution prevention and control law	25.4	21.6	33.0	26.2	0
Environmental noise pollution prevention and control law	25.0	19.0	17.0	15.2	18.5

TABLE 3: Environmental pollution analysis.

Environmental pollution incident	The way pollutants are transferred to the environment	Contaminant migration process	Receptor exposure pathway
Fire	Volatilize to atmosphere	Atmosphere-plants	Plant leaf respiration
Gas leak	Diffuse into the atmosphere	Atmosphere-plants	Plant leaf respiration
Discharge of pollutants	Discharge into groundwater	Groundwater-plants	Uptake by plant roots
Uptake by plant roots	Infiltrating soil	Soil-plant	Soil-groundwater-plants
Stationary waste accumulation	Particles and dust are dispersed into the atmosphere	Atmosphere-plants	Plant leaf respiration

TABLE 4: River pollution level table.

Pollution level	P1	P2	P3	P4	P5	P6
Water quality index	(0,0.2]	(021,0.4]	(041,0.7]	(071,1.00]	(1.01,2.00]	>2.00
Degree of pollution	It is good	Better	Light pollution	Moderately polluted	Heavy pollution	Heavily polluted

wild plants. Much soil erosion makes the water turbid. A dry season and dilution because of deforestation can reduce the river flow. The purification capacity of the river is reduced, and the degree of water pollution is reduced. For the river environment, to make the water quality status easier for us to see clearly, we divided the water pollution levels into 6 grades (Table 4).

There are various factors that cause environmental damage in our country. Among them, urban pollutant emissions are the most serious, followed by a large number of vehicle exhaust emissions. These pollutants are essential. We can only find ways to reduce these emissions or use other eco-friendly items to replace them. For now, the proportion of serious pollutants in the country is shown in Figures 2 and 3.

(1) For urban emissions: vigorously reduce citizen waste, reduce sewage discharge, utilize predischarge sewage treatment technology, develop and apply clean energy, reduce urban greenhouse gas emissions and the sound of car horns. (2) For vehicle exhaust emissions: make the country vigorously develop fuel substitutes, thereby reducing vehicle exhaust emissions, and vigorously develop clean energy vehicles, such as electric energy, solar energy, and wind energy. Optimize urban traffic road system: the optimized road can make cars take less detours and reduce emissions.

Thus, the burning of energy in the car is reduced, and the smoother roads will continue to reduce the energy consumption of the vehicle.

At present, it can be concluded from Figure 3 that the country's environmental pollution problem can no longer be ignored. Problems, such as resource problems, land degradation, energy problems, and water shortages, are becoming more serious. People need to start on their own and improve their environmental awareness. Enterprises also need to enhance their sense of responsibility, strictly follow the national pollution and waste disposal requirements, and control the environmental pollution in the production process. The national regulatory agency needs to strengthen basic supervision and control. When pollution continues to increase, people will increase investment in scientific research to better solve the problem of environmental pollution in the country, and the environment can be continuously improved.

4.4. The Relationship between Environmental Law and the Green Principles of Civil Law. The environmental law manages social relations beyond the control of the civil code: firstly, the ultimate goal of the country's environmental law
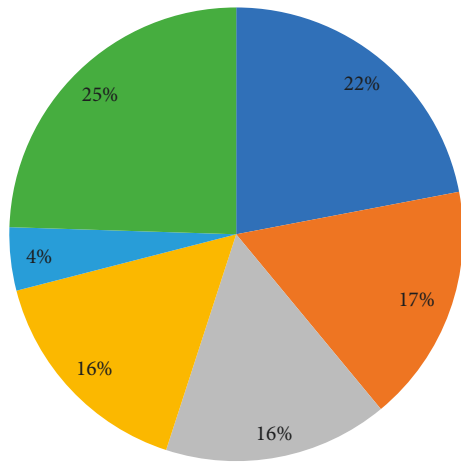
FIGURE 2: Proportion of pollutants discharged.
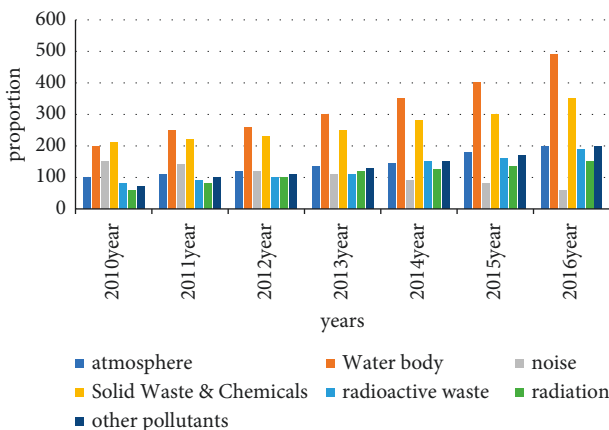
FIGURE 3: General proportion of pollutants.

is to ensure sustainable social development. It is a form of law designed to be fulfilled, and it is difficult to incorporate the spirit of that law into the rights of all. Because of the economic conditions of the Chinese market at that time, it was difficult for civilians to engage in civil law activities. Therefore, the protection of certain individual rights related to certain environmental laws is a protection system suitable for the country's national conditions. The current social environment is likely to cause serious social problems and lead to the unfavorable implementation of the country's environmental protection policies. It requires the environmental law to fill the blank of civil law, mutual promotion, and joint promotion of ecological environmental protection. The green principle of civil law protects the personal and property rights of the victims of environmental pollution, controls the illegal acts of pollutants in accordance with the
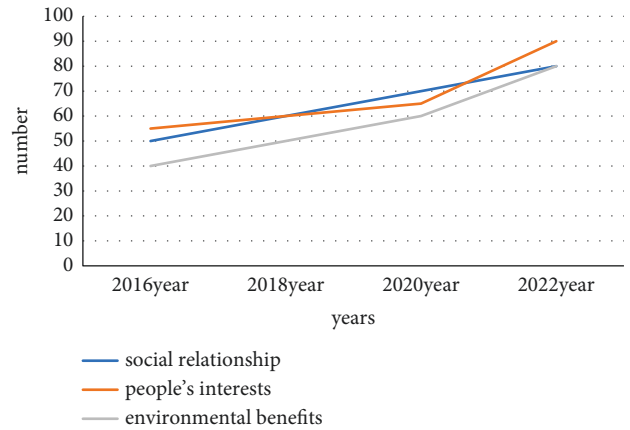
FIGURE 4: The result of the fusion and coordination of the two.

law, protects the ecological environment in principle, and reduces environmental pollution from the source. The civil law regulates social relations as a basic legal order to establish the correct codes of conduct according to the development of society, and the green principle applies to all citizens. It provides a legal basis for the subject of resource conservation and environmental protection, ensuring the successful realization of environmental benefits. The integration of environmental law and community law promotes the sustainable development of the environment: the essence of community law is every citizen's responsibility for environmental protection. Combining the legal environment with community rights requires both saving social resources and protecting and promoting the ecological environment. The sustainable development of society is the engine of development. Incorporate green principles into the civil code. The state is no longer the only institution protecting the ecological environment. Every citizen in society needs to be aware of environmental benefits. The above characteristics can be summarized through the renderings of their fusion in recent years. It is shown in Figure 4.

4.5. The Coordination Relationship between Environmental Law and the Green Principle of Civil Law and the Analysis of the Ecological Environment. Their mutual absorption and strengthening have led to a new improvement in the system. Environmental damage compensation system: compensation that can only be provided in accordance with the environmental damage tort law of the People's Republic of China is an incomplete remedy. However, the green principles go beyond these limits, and people feel their environmental rights are being violated. One can only get legal protection if one's personal or property rights are violated by environmental pollution. The country's civil procedure law does not define the status quo of environmental rights. However, the green principles define the environmental rights of citizens. For this, therefore, one can claim compensation for environmental damage if their privacy and property rights are violated. Ecological protection red line system: the ecological protection red line system creates a strict ecosystem protection system. Adhere to ecological
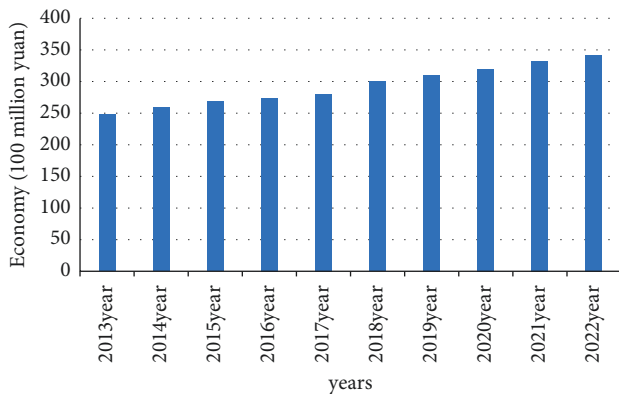
FIGURE 5: Scale of recyclable waste in the country from 2013 to 2020.
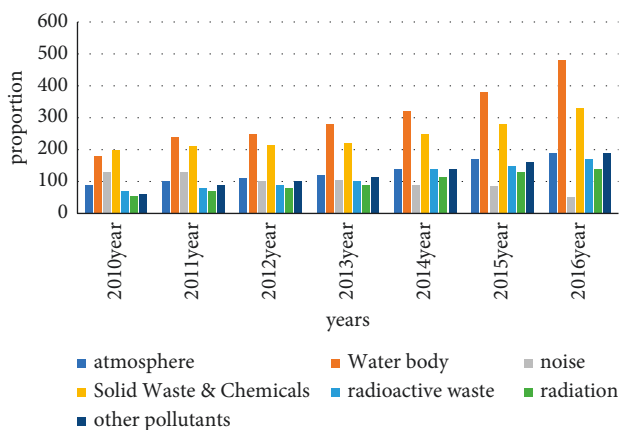
FIGURE 6: The proportion of pollutants after improvement.

security norms to ensure the coordinated and common development of ecological interests in the process of economic and social development. All civil law subjects have a protected environment. All citizens need to protect the ecological environment and monitor illegal activities that damage the environment. This strengthens environmental protection laws and expands the scope of the redline system. It has greatly helped the protection of the ecological environment: the country's investment in the environment has also greatly increased, and citizens' awareness of the environmental protection has been continuously improved. Various factors are developing in a positive direction. Figures 5 and 6 reflect the proportion of pollutants after the country's investment in recyclable waste and the integration of the two.

5. Conclusion

The theme of this paper is the analysis of the coordination relationship between the green principle of civil law and environmental law in environmental pollution and ecological destruction, which discusses the definition, main content, characteristics, and development of the environmental law. The author designed and experimented with the detection method of environmental pollution and ecological

emergency risk index, calculated the characteristic quantity of serious environmental pollution, and concluded how to effectively solve the problem of environmental pollution. Although the country's environmental problems are serious now, the integration of the green principles of the civil law and environmental law will greatly reduce pollution problems. Not only the environment has been improved but also the laws and people's livelihood have been greatly improved. The author believes that in the future, the relationship between the country's green principles and the environmental law will become closer, and the environment will become more perfect.

Data Availability

The experimental data used to support the findings of this study are available from the author upon request.

Conflicts of Interest

The author declares no conflicts of interest regarding this work.

Acknowledgments

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Research Article

Analysis of the Key Factors of Ecological Environment Protection in the National Economic Sustainable Development Goals

Haiwen Long (iD)

Business School, Yuxi Normal University, Yuxi 653100, China

Correspondence should be addressed to Haiwen Long; lhw@yxnu.edu.cn

Urbanization helps people to create comfortable and convenient living conditions and meets the needs of people survival, enjoyment, and development. At the same time, the surge in population has also caused great disturbance and damage to the urban natural environment. Humans continue to utilize and transform nature by increasing the absolute surface area of the natural environment, but at the same time, rapid population growth and scarcity of resources exacerbate the absurd development and utilization of resources, leading to ecological destruction. The development of green plants, animals, and other creatures is hindered, and the imbalance of urban ecology aggravates the contradiction between man and the ecological environment. Based on this, the paper first expounds on the theoretical framework of sustainable economic development, draws the analysis of the elements of sustainable economic development, and then studies the coupling relationship model between economic development and ecological environmental protection as an example of the regional economy. GM (1.1) principle was used to test the practicability of the model and found that the model is very accurate in predicting the coordinated development between economic development and ecological environmental protection. It provides a comprehensive index of the sustainable capacity of the ecological environment in urban areas, analyses the indicators of Leshan City, and draws a conclusion: the main factors affecting the sustainable development of Leshan's ecological environment are the economic environment and the natural environment; it is necessary to further adjust the industrial structure. In order to maintain sustained and stable economic development, it is very important to strengthen urban environmental protection, develop circular economy, and continuously improve the level of ecologically sustainable development.

1. Introduction

Researching and improving the ecological environment of arid areas in western China is of great significance to the implementation of national strategies and policies to accelerate the development of this area. The purpose of this project is to determine the dynamic carrying capacity and ecological water demand of arid areas in western China. At the same time, an ecological environment evolution model and an ecological environment information system have been established [1]. In an ecological environment, after inputting the reflective properties of the lower surface, the terrestrial solar radiation spectral flux on the clear sky level at any time of year, geographic location, and altitude can be

calculated. The comparison of the measured values is consistent [2]. The Zoige Plateau has been showing signs of swamp degradation since the 1960s. Forty years later, the ecological environment has deteriorated, and swamp degradation has become increasingly serious. Compared with natural factors, the disturbance of human activities is the main reason for the deterioration of the ecological environment and swamp degradation [3]. Land consolidation is a process of rebuilding the ecological environment system, which has an impact on regional environmental factors and ecological processes. This paper proposes three factors that affect the regional ecological environment in the process of land consolidation, and analyses the impact of these factors on the regional ecological environment [4]. With the rapid

development of the economy, the degree of people's exploitation of natural resources is increasing. Under the combined action of natural and human factors, the hydrological properties of wetlands have undergone tremendous changes. Therefore, the author takes Baiyangdian wetland as an example to study sustainable development strategies in order to achieve the harmonious development of ecology, society, and economy [5]. Official estimates of the cost of traffic accidents in 1990 or later, compiled from readily available information for 12 countries, have a segmental impact on national economies, and estimates of gross national product are taken from OECD publications [6]. In Ireland, where a recent study assessed the national and regional economic value of the maritime sector, the input-output approach could examine the linkages and impact of Irish maritime revenues on the national economy. This analysis shows that Ireland's economic support mostly depends on seafood [7]. Ghana's minerals and mining sector has seen a major recovery over the past 15 years, with the government's economic recovery programme launched in 1983. Given the significant contributions identified, the paper concluded that the mining industry in Ghana is sustainable and the government is currently focusing on implementing these policy initiatives [8]. On the basis of analysing the characteristics of water use in various industries of the national economy, the author proposes a method to quantitatively determine a water-saving and high-efficiency water-use social production system, and establishes a water resource input-output analysis model, which will be applied to the actual situation in Beijing. Situation analysis [9]. The development of tourism plays an important role in adjusting the national economic structure and optimizing the enterprise structure. However, the status of tourism in the national economy is still a controversial topic, and the research results not only objectively reflect the status of tourism in the national economy but also improve the insufficiency of tourism statistics and industry contribution assessment [10]. The green economy is usually not a drag on growth, but a new engine of growth and an important strategy for eradicating persistent poverty. At the same time, there is growing evidence that the future is heading for a new economic paradigm—one in which the provision of material wealth is not necessarily accompanied by growing environmental risks, ecological scarcity, and social inequality at the expense [11]. The report gives a shocking figure, investing 2% of domestic GDP in 10 sectors of the green economy. This has important significance for social harmony and economic development, and green economy is a way to promote sustainable development at the global, national, and regional levels [12]. From local to global, scientists and communities must support systems for life on Earth and meet the needs of human development. This study shows that efforts to promote sustainable development are more likely to succeed if they are used to protect the boundary between knowledge and action while enhancing the visibility, credibility, and legitimacy of the knowledge they generate [13]. In this paper, we propose and rationally analyse the concept of the environment (EKC). It is considered that the relationship between environmental pollution and per capita income is inverted U-shaped, thus reducing the impact of economic activities on the environment, a concept based on an economic model in which environmental quality affects production opportunities and does not affect environmental degradation [14]. The past decade has seen a series of increasingly active movements using science and technology to seek the transition to sustainable development. These campaigns are based on broadness, that is, the challenge of sustainable development is to reconcile social development goals with the Earth's long-term environmental protection goals [15].

2. The Theoretical Framework of Sustainable Economic Development

2.1. The Concept of Sustainable Development. The concept of sustainable development shows that the carrying capacity of the environment and ecology is not infinite, and the total amount of natural resources is also limited. For a long time, only renewable resources can ensure the sustainability of development. The development process will only be sustainable if it is ensured that the overall capacity remains the same or increases over time. Sustainable development is a benign development process with an upward trend. This new development concept has three basic characteristics: First, sustainable development is balanced. Sustainable development emphasizes the balanced development of regions. Sustainable development requires each region to develop independently and not affect each other, that is, today's efforts are for a better tomorrow; the other is the harmonious development of man and nature in sustainable development. Sustainable circularity for continued development: sustainable development is a spiral development process. In such a vicious and virtuous cycle, it is necessary to select an appropriate development speed and scale according to the development capabilities such as resource capacity and environmental capacity.

2.2. Quantitative Measurement of Sustainable Development. Quantitative measurement of sustainable development is one of the core issues and theoretical frontiers of relevant economics research. Quantitative measurement of sustainable development mainly focuses on the sustainable development index system. The construction of the current international sustainable development indicator system and its calculation method generally conforms to two ideas: one is to incorporate sustainable development into the national accounts system, expand the current GDP and its system framework, and build an environmental and economic accounting system, including traditional economic accounts. The second is to follow the general idea of sustainable development theory and build a statistical index system and evaluation model reflecting sustainable development. There are two different opinions. One is to advocate the ability, performance, and achievement of sustainable development to be measured by a single comprehensive statistical indicator;

2.3. The Core of Sustainable Development Is Sustainable Economic Development. The core of sustainable development is sustainable economic development, while developed countries propose to focus on sustainable development of the environment, such as environmental pollution and nature protection. Therefore, their environmental protection concept is based on the relatively developed economy, and their understanding of the concept of sustainable development expresses their support for sustainability. Sustainable development can be understood as a dynamic process. In the short term, due to pressures such as "poverty," economic development becomes a key theme, and as environmental conditions deteriorate, "environmental protection" becomes relatively important worldwide. Economic development requires the coordination of environment and development. Sustainable development has become an ideal model of economic development and an important part of sustainable economic development. It is also the sustainable growth of the economy and the profitability of people's production and business activities. With the continuous development of society, more and more attention has been paid to the stable and sustainable supply of natural resources and the environment, which is not only the premise of economic growth but also the premise of sustainable economic growth and coordination of resources and environment.

2.4. Analysis of Elements of Sustainable Economic Development. The debate on the factors of economic growth is not only a central issue in economics but also one of the longest and most debated topics in the history of economic thought. As economists struggle to explain the continued growth in people's productivity and incomes, they find that understanding this complex phenomenon requires adding more and more elements to the analytical framework.

In 1950, the economic circle put forward the total production function relationship that reflects the input of capital, labour, etc., and the expected return. So far, the theory that labour has a positive impact on economic growth has begun to revive. Some theories of the last century even believed that population growth was the main driving force of economic growth. Economists no longer look at economic growth from the perspective of a specific production function, recognizing that better technology can improve the level of the production function. Factors such as high savings rates, high levels of education, and positive technological innovation are signs of development associated with economic growth, facts explained by economic development theories, and not causes of development. We should also pay attention to the impact of natural resources and the environment on economic growth; especially since 1990, the concept of "sustainable development" was introduced in the analysis of sustainable economic long-term growth, and the incorporation of the environment into the analytical framework has become a solid economic an indispensable prerequisite for sustainable development theory (Figure 1).

China's extensive economic growth has come at the expense of environmental pollution. At present, China's economic growth is slow, and the problem of environmental pollution cannot be ignored. Empirical analysis shows that the overall model of economic growth at the expense of the environment is unsustainable; in other words, environmental inefficiency and unsustainable development hinder economic development and make sustainable economic development impossible; environmental protection efficiency and sustainable development are a prerequisite for achieving sustainable economic development.

3. Study on the Relationship between Economic Development and Ecological Environment Protection

3.1. Establish an Index System and Standardize It

3.1.1. Index System Construction and Index Selection. The economy and environment are two very complex systems, and it is difficult to construct a relevant indicator system. Therefore, this paper is based on four principles: scientificity, accuracy, practicability, and unity. Based on the research experience of the researchers, and taking the regional economy as an example, an indicator system for the coordinated development of the regional economy and the ecological environment has been established.

3.1.2. Standardization of Indicators. In the actual operation of the evaluation object with multiple attribute indicators, it is usually necessary to process the evaluation value of the standard evaluation object to eliminate the dimensional difference between various indicators, such as appropriate transformation of indicators of different sizes, removing the effects of nature, units, and quantities between individual data, and converting all data to the same size and into unmeasurable standardized indicators. We know that the economy and ecosystem are two very complex systems, and the relevant indicators are economy, society, resources, environment, etc., and must be analysed in multiple dimensions. If the collected data are directly applied to the relational calculation, there may be errors in the calculation results. The advantage of the range transformation method is that the index value satisfies $0 \leq y_{ij} \leq 1$. Higher values of positive indicators indicate better economic and environmental performance, and there is a positive correlation between them and vice versa.

Suppose the eigenvectors of the environmental system and the economic system are $\overline{X_{ij}} = (X_{i1}, X_{i2}, X_{i3}, \ldots, X_{ij})$; normalizing X_{ij} gets

(1) When X_{ij} is a positive correlation indicator:

$$\overline{X_{ij}} = \frac{X_{ij} - X_{j\min}}{X_{j\max} - X_{j\min}}. \tag{1}$$

(2) When X_{ij} is a negative correlation indicator:

$$\overline{X_{ij}} = \frac{X_{j\max} - X_{ij}}{X_{j\max} - X_{j\min}}. \tag{2}$$
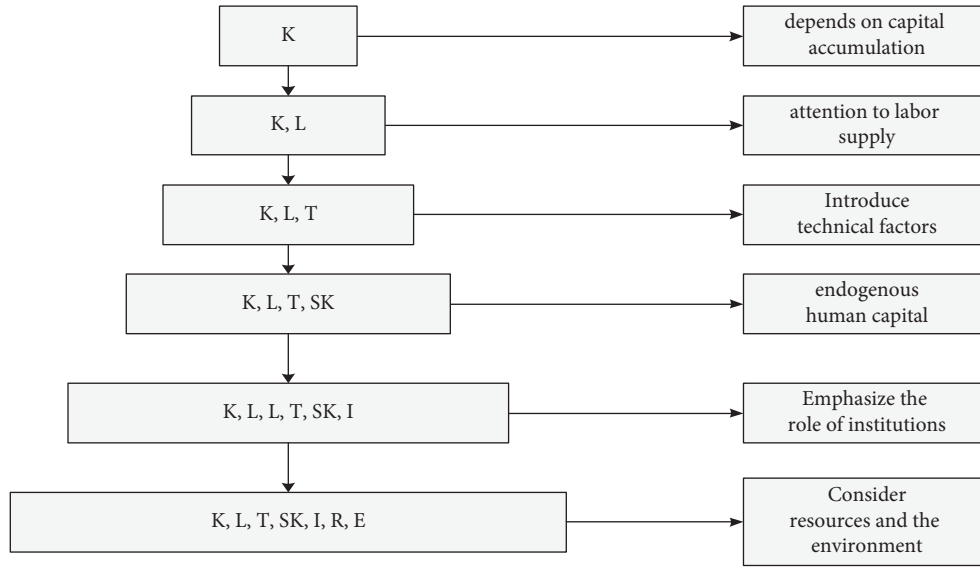
FIGURE 1: Analysis of the elements of sustainable economic development.

Among them, X_{ij} represents the i-th actual observed value of the j-th indicator, $X_{j\max}$, $X_{j\min}$ represent the maximum and minimum values of the j-th indicator, and $\overline{X_{ij}}$ is the standardized data.

The indicator weight refers to the quantitative value of the proportion of each indicator of the measured object, which can also be called the sum of the weight factor and the indicator, and the indicators at each level should be weighted for calculation. The data are standardized to determine the entropy of the information. The data entropy of the j indicators can be defined as follows:

$$E_j = -\frac{1}{\ln m}\left(\sum_i^m F_{ij}\ln F_{ij}\right). \tag{3}$$

In the formula, F_{ij} is the standardized value of the index data X_{ij}. Finally, according to the formula to determine the index entropy weight W_j, the formula is as follows:

$$W_j = \frac{1 - E_j}{n - \sum_j^n E_j}, \tag{4}$$

where i and j start from 1, m is the year, and n is the number of indicators. According to the above steps, the weights of the regional economic system and environmental system indicators are calculated as shown in Table 1.

3.2. Model Establishment

3.2.1. Comprehensive Evaluation Model of Regional Economy.
A comprehensive evaluation model of the regional economy is constructed, and the evaluation formula is as follows:

$$f(x) = \sum_{i=1}^n a_i x_i. \tag{5}$$

Among them, n is the number of indicators, a_i is the indicator weight, and x_i is the standardized data.

3.2.2. Regional Comprehensive Environmental Assessment Model.
To construct a regional environmental comprehensive evaluation model, the evaluation formula is as follows:

$$g(y) = \sum_{i=1}^m b_i y_i. \tag{6}$$

Among them, m represents the number of indicators, b_i represents the weight of the indicators, and y_i is the standardized data.

3.3. Regional Economy and Environment Coupling Degree and Coupling Coordination Degree Model.
The degree of coupling is related to the degree of interaction between systems. It is used to measure the degree of granularity between systems and the relationship between different internal elements of the system. It can also measure the level of co-ordination between the economy and the environment in a country or region. The coefficient of variation is used to derive a computational model for the degree of coupling between the economy and the environment. When comparing the decomposition degrees of two data sets, if the number of the two data sets is too large or the comparison dimension is too large, the standard deviation should not be used. It just so happens that the coefficient of variation can replace the standard deviation method, measuring the variance, the higher the mean of the variable, the greater the dispersion, and vice versa. The formula for the coefficient of variation is as follows:

$$C_v = \frac{2S}{[f_{(x)} + g_{(y)}]}. \tag{7}$$

TABLE 1: Weights of regional economic and environmental system indicators.

Economic system	Weight	Environmental system	Weight
Total output value	0.165	Afforestation area	0.169
Total export-import volume	0.139	Land area covered with trees	0.152
Energy consumption per unit of GDP	0.153	Waste water discharge	0.155
Productivity of labour	0.158	Salvage value	0.148

Coefficient of variation: when the scatter of two data sequences needs to be compared, and the scale difference between the two data sequences is too large, the coefficient of variation can eliminate the influence of scale and measure, where S is the standard deviation. The formula for determining the degree of coordination between economy and environment is as follows:

$$c = \left\{ \frac{f_x \times g_y}{\left[(f_x + g_y)/2 \right]^2} \right\}^k. \tag{8}$$

Among them, C, $f(x)$, and $g(y)$ are the coupling degree, economic aggregate level, and environmental aggregate level, respectively, and K is the correction factor, which generally ranges from 2 to 5, and K is 4. The degree of coupling indicates that the level of coordinated development of the economy and the environment is positively correlated. The coupling model sometimes produces results that are inconsistent with the actual situation, and it is impossible to analyse whether the relationship between them is positive or negative. For example, the two regions have the same degree of connection between the environment and the economy, but it is possible that one region has a higher level of integrated development of the environment and the economy, while the other region is just the opposite, and its objective authenticity remains to be explored. The functional model of the coordination degree D is as follows:

$$\begin{aligned} D &= (C \times T)^{1/2}, \\ T &= (\alpha + \beta)(f_y + f_x). \end{aligned} \tag{9}$$

Among them, D is the coupling coordination degree, T is the overall economic and environmental development evaluation index, and α and β are the weights of each subsystem. Since the economic subsystem and ecological subsystem are of equal importance in the research process, the given value $\alpha = \beta = 0.5$, and the value range of D is 0-1. This is the definition of the degree of interconnected coordination.

3.4. Forecast of Coordinated Development between Economic Development and Ecological Environment Protection.
In order to better understand the constraints of regional economic and environmental development and the future development situation, to predict the degree of coordination between the regional economy and the environment, and the future economic and ecological conditions from 2007 to 2017, a GM (1, 1) model was constructed.

3.4.1. Principle of GM (1.1).
Let $X^{(0)}$ be the modelling sequence of GM (1, 1), $X^{(1)}$ be the one-time accumulation sequence, and let $Z^{(1)}$ be the generation sequence of the mean value (MEAN) of $X^{(1)}$'s immediate neighbours, then the following relationship is obtained:

$$\begin{aligned} X^0 &= \left(x^0(1), x^0(2), \ldots, x^0(n) \right), \\ X^1 &= \left(x^0(1), x^1(2), \ldots x^0(n) \right), \\ x^1(k) &= \sum_{i=1}^{k} x^0(i), \quad k = 1, 2, \ldots, n, \\ Z^1(k) &= \frac{1}{2} x^1(2k-1), \quad k = 2, 3, \ldots, n. \end{aligned} \tag{10}$$

Then, the definition type of GM (1, 1), that is, the grey differential equation model of GM (1, 1) is as follows:

$$x^0(k) + az(k+1) = b, \tag{11}$$

where a is the development factor and b is the grey action. The bleaching equation (shading equation) of the grayscale differential equation is as follows:

$$\frac{dx^2}{d(t)} + ax = kb. \tag{12}$$

As mentioned above, there is a solution to the whitening equation, also known as the time-response function, which is expressed as formula (13), and the time-response sequence of the GM (1, 1) grey differential equation is expressed as formula (14), and the reduction of the grey differential equation is further obtained. The value is shown in Equation (15).

$$x(t) = \left(ex - \frac{b}{a} \right) + \frac{b}{a} e^{at}, \tag{13}$$

$$x(k+1) = \left[kx - \frac{b}{a} \right] e^{-ak} + \frac{b}{a} e^{ak}, \tag{14}$$

$$x^1(k+1) = x^0(2k-1). \tag{15}$$

3.4.2. Model Establishment.
According to the above GM (1, 1) principle, all λ are within the public coverage, so the original sequence does not need to be processed by the attenuation buffer operator, but a GM (1, 1) model can be established for it.

$$\lambda_k = \frac{x^{(0)}(k-1)}{x^{(0)}(k)}, \quad k = 2, 3, \ldots, 11. \quad (16)$$

Construct an accumulation sequence once:

$$X^{(1)} = \left(x^{(0)}(1), x^{(0)}(2), \ldots x^{(0)}(n) \right)$$
$$= (0.4290, 0.9771, \ldots, 6.1376, 6.9776). \quad (17)$$

Finally, the prediction model is obtained:

$$\frac{dx^{(1)}}{dt} - 0.0454x^{(1)} = 0.4979, \quad (18)$$

$$x^{(1)}(k+1) = \left[x^{(0)}(1) - \frac{b}{a} \right] e^{-ak} + \frac{b}{a}$$
$$= 11.3932e^{0.054k} - 10.9642. \quad (19)$$

To sum up, the established GM (1, 1) model is scientific. In this model, the data from 2018 to 2025 are first predicted; since the data collection will not end until 2025, the degree of linkage between the regional economy and the environment in 2018 and 2019 is predicted. The prediction results are shown in Table 2.

It can be seen from Table 2 that the coordination degree between regional economy and environment has improved from 2018 to 2025, and the development level of interconnection in the next 8 years has also changed from good coordination and optimization to quality coordination. This shows that the transformation and promotion of the regional economy, the support of relevant government policies, the continuous improvement of people's living standards, and the popularization of environmental protection concepts have all contributed to the coordinated development of the regional economy and environment, and are developing in a sustainable direction.

4. Empirical Research on Sustainable Development of Ecological Environment

4.1. Instance Selection. In recent years, Leshan's social economy has developed rapidly. The economic growth rate of Leshan has exceeded 10% in recent years. Leshan has become a world famous tourist city based on economic conditions alone. The environment has also changed dramatically. Therefore, we choose Leshan City as the representative to study the key factors of ecological environmental protection in sustainable economic development. The continuous expansion of urban buildings and public spaces, the continuous increase in the population base, the continuous increase in various industrial and domestic garbage dumps, and the decline in living comfort, traffic congestion, and noise pollution have caused serious impacts on the ecological environment and the sustainable development of urban areas, which seriously threatens the sustainable development goals of Leshan City. We have conducted a comprehensive study on the urban ecology and economic sustainability of Leshan, and put forward reasonable suggestions to improve the ecological sustainability of the urban

Table 2: Predicted value of the coupling coordination degree between economy and environment in 2018–2025.

Year	Coupling coordination degree	Coupling coordination level
2018	0.8336	Good coordination
2019	0.8723	Good coordination
2020	0.9128	Quality coordination
2021	0.9552	Quality coordination
2022	0.9996	Quality coordination
2023	1.0406	Quality coordination
2024	1.0946	Quality coordination
2025	1.1455	Quality coordination

environment. Promoting environmental harmony is of far-reaching significance and is conducive to the sustainable development of economy, society, and environment.

4.2. Calculation of Various Indices of Urban Ecological Environment. Using the calculation method of ecological indicators, refer to the "Leshan City Statistical Yearbook 2016–2020," "Environmental Quality Report," "City Quantitative Evaluation," and other materials and obtain the relevant data of Leshan City from the four levels of different standards in the city (Table 3).

Engel coefficient is an important symbol to measure the wealth of a region or country. Generally speaking, under all conditions being equal, the higher the Engel coefficient, the lower the regional total profit and lower the gross national income, and vice versa. Table 3 shows that from 2016 to 2020, the social, economic, and natural environment of Leshan City underwent significant changes. The population has not changed much, which shows that Leshan City has well implemented the national population policy and the control measures are effective; the per capita GDP has increased year by year, and the economic environment is better than above; with the development of the social economy, the disposable income of urban residents has also increased. With the continuous improvement, people's quality of life has improved. At the same time, the Engel coefficient and the urban-rural income gap have narrowed; not only the living conditions of urban residents have been improved but the social and economic environment of the rural population has also been greatly improved. However, the urban-rural income gap still exists. To improve this situation, it is necessary to further increase rural incomes, improve the quality of life of farmers, and increase poverty alleviation projects, which must be based on effective government action.

As shown in Figure 2, from 2016 to 2020, the per capita public green space in Leshan City showed an increasing trend, but the trend was flat, and the per capita area was less than 22 square meters. But it also shows that from 2016 to 2020, the green area of Leshan City is on the rise, the green area has increased, and the environment has become more beautiful. The changes in per capita road area have different laws. Within 5 years, the per capita road area has increased, but the change has not changed much, indicating that the government does not pay enough attention to traffic roads.

TABLE 3: 2016–2020 indicator data of Leshan City.

Name of index	2016	2017	2018	2019	2020
Density of population	0.0272	0.0271	0.0274	0.0273	0.0275
Per capita GDP	0.535	0.578	0.629	0.863	0.982
Per capita public green space area	15.24	16.43	17.68	19.91	21.67
Road area per capita	39.71	42.75	46.63	48.72	51.71
Engel coefficient (%)	37.2	36.5	35.2	34	33.1
GDP rate of rise (%)	9.5	18.2	18.7	17.6	14.1
Urban-rural income ratio	2.25	2.23	2.21	2.19	2.14
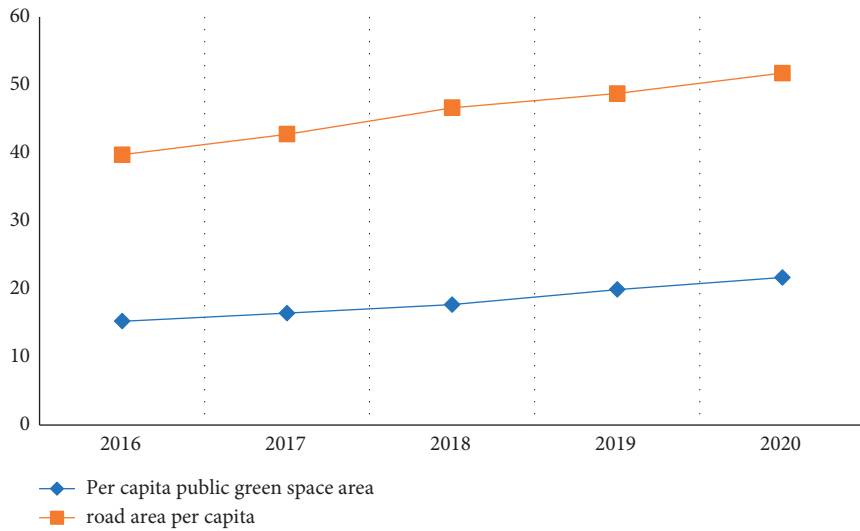
FIGURE 2: Trend line of per capita public green space and road area.

At the same time, the 5-year GDP growth rate and Engel's coefficient (Figure 3) show that Leshan's economy and people's living standards have improved significantly over the past 5 years. By 2017, the GDP growth rate of Leshan City has exceeded 10%; especially in 2018, the growth rate was 18.7%, which was the year with the largest growth rate, but the economic growth rate will slow down in 2020. In recent years, the number of air pollution days has changed rapidly, and the number of air pollution days should increase slightly, indicating that environmental protection measures are still insufficient.

4.3. Analysis of Key Factors of Ecological Environment on Economic Development. As the economy develops, so does the quality of the natural environment (Figure 4). In 2020, the area of noise pollution in the whole district of Leshan City increased compared with 2016, decreased in 2018, and increased again in 2019. In 2017 and 2018, the area of water pollution increased compared with the previous year, and the remaining years decreased compared with the previous year. Especially in 2020, the area of water pollution fell to the lowest point in a year from 19 years. The occurrence of this situation is closely related to the environmental protection management measures in Leshan City. The increasing trend of water pollution areas in the past 2 years indicates that

Leshan may have insufficient implementation of environmental protection measures, or pursue maximizing economic benefits while ignoring environmental impacts.

The organic whole of the social, economic, and natural environment forms the environment of the entire urban area. The three must develop in harmony in order to realize the protection of the ecological environment. Using the above estimation model, the secondary and primary index values of Leshan City were obtained according to Table 4 and Figure 5.

Figure 5 shows that from 2016 to 2020, the value of the secondary indicators of the social and economic environment in Leshan increased year by year. The growth rate was relatively stable in the first 2 years, but after 2018, the growth trend was obvious. It can be seen that the economic and social environment of Leshan City has improved significantly compared with previous years. In general, the social and economic environment of Leshan is getting better year by year. The difference is that the natural environment also showed an upward trend before 2017, but dropped sharply in 2018, indicating that the natural environment in Leshan in 2018 was worse than in previous years, but the natural environment in the following year improves.

However, as can be seen from Table 4, although the economic development has grown, the urban-rural income ratio is still relatively high. 2018 was the peak in the past 5 years. Since 2019, the urban-rural income ratio has declined,
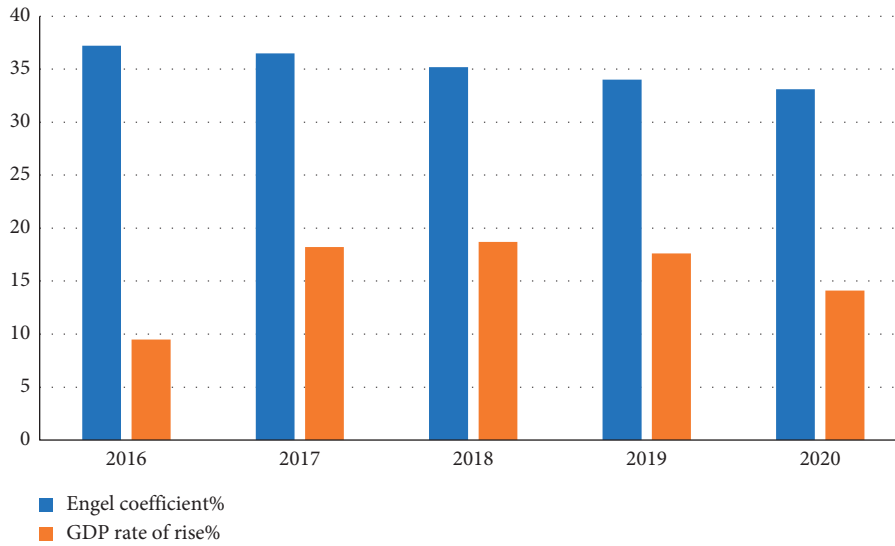
Figure 3: Trend of economic index changes.
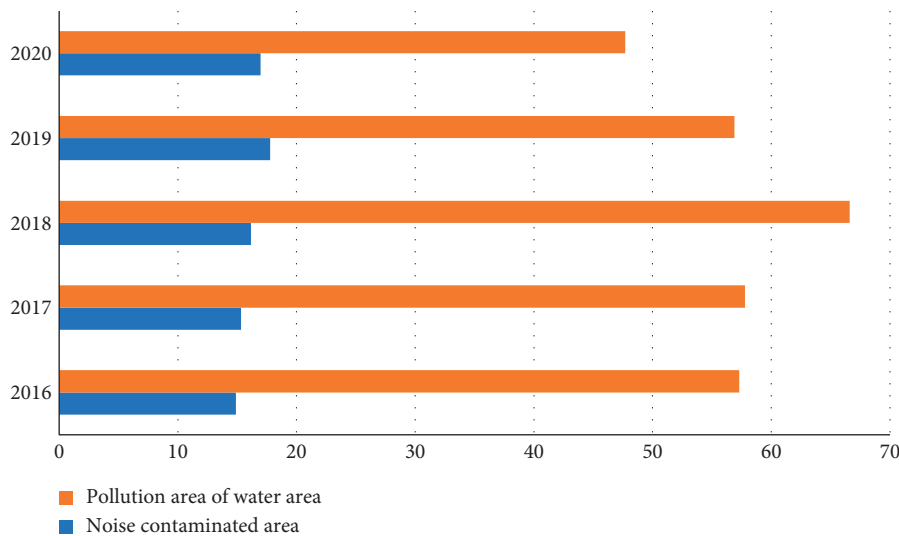
Figure 4: Changes in noise and water pollution areas.

Table 4: Secondary index values in Leshan City.

Class	2016	2017	2018	2019	2020
Social environment	0.67	0.68	0.73	0.84	0.88
Economic environment	0.64	0.65	0.7	0.81	0.83
Natural environment	0.61	0.62	0.56	0.64	0.75

but the decline is small, indicating the urban-rural population. The income gap is still large; therefore, the urban sustainable development capacity can be divided into four levels according to the value of the urban ecosystem health index (Table 5).

According to Table 5, we can qualitatively evaluate the sustainable development of the ecological environment of Leshan City in the past 5 years (Table 6).

It can be seen from Tables 5 and 6 that the sustainability of the ecological environment in Leshan City is improving year by year. The improvement is not large enough, such as noise, water pollution, and air pollution days, and there is still room for improvement.

Figure 6 shows that from 2016 to 2020, the sustainable capacity of the ecological environment in Leshan City showed a steady growth trend, and the overall development trend was slow. In terms of comprehensive indicators, the environmental sustainability of Leshan has gradually increased from 0.541 in 2016 to 0.834 in 2020, which is mainly due to the rapid economic development of Leshan in recent
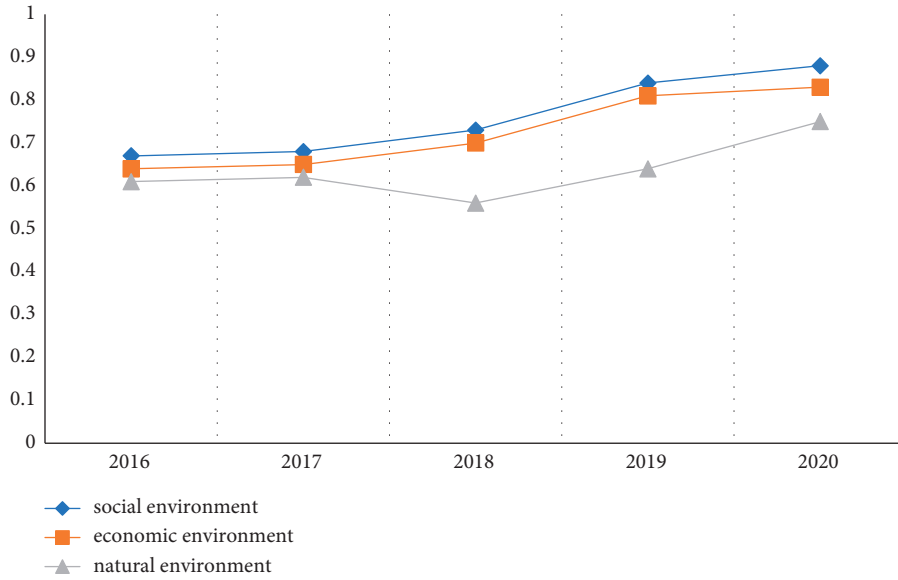
FIGURE 5: Trend chart of secondary indicator values from 2016 to 2020.

TABLE 5: The grading standard of urban ecological environment sustainability.

Grade	Exponential quantity	Qualitative evaluation
One	> 0.8	Fine
Two	0.6–0.8	Preferably
Three	0.4–0.6	Same as
Four	< 0.4	Very bad

TABLE 6: The first-level index values of Leshan City in 5 years.

	2016	2017	2018	2019	2020
Level 1 indicators	0.541	0.572	0.684	0.717	0.834
Qualitative evaluation	Same as	Same as	Preferably	Preferably	Fine
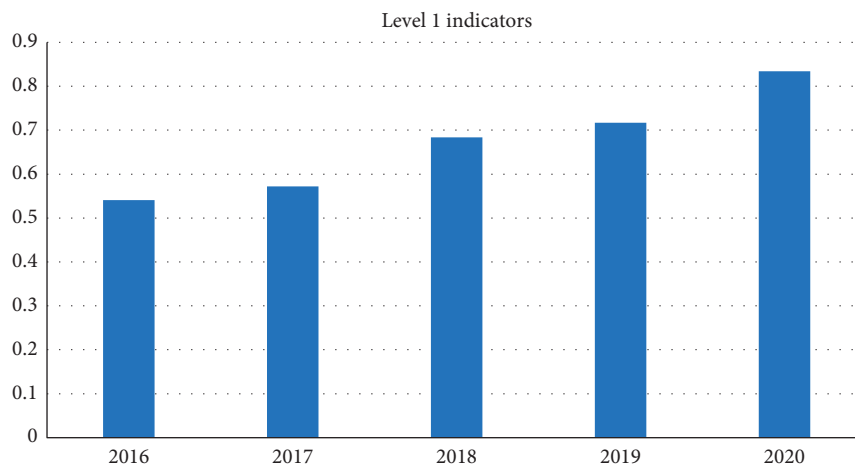
FIGURE 6: Trend chart of sustainable development capability of ecological environment in Leshan City.

years. According to the evaluation criteria of the index, the urban ecological environment of Leshan has developed from "moderate sustainable development, relatively harmonious economic environment and society" to the current level of "good sustainable development, harmonious economic environment and society." Most of the indicators are moving

towards excellent standards, indicating that the urban ecological environment of Leshan is gradually showing the harmonious development of society, economy, and nature.

4.4. Empirical Results. The main factors that promote the sustainable development of Leshan's ecological environment are the economic environment and the natural environment. The continuous improvement of Leshan's environmental remediation and environmental protection investment has significantly improved the overall quality of Leshan's urban environment, improved its pollution control capabilities, and achieved good results in ecological city construction. The main factor that promotes the sustainable development of Leshan's ecological environment is the social environment. The rapid economic development has brought enormous pressure to the urban environment. The construction of urban infrastructure is relatively lagging behind, which further affects the quality of life of residents. In addition, the energy consumption per 10,000 yuan of GDP is much higher than that of developed coastal cities, the unemployment rate remains high, and the water quality of major rivers is poor, which are important factors to promote the healthy and sustainable development of the regional economy.

5. Conclusions

From regional economic and environmental research to the sustainable development of the national economy, we find that the main factors that make positive contributions to the sustainable development of the ecological environment are the economic environment and the natural environment. Citizens' environmental awareness and environmental quality are sustainable, which are important part of development goals. To improve public awareness of environmental protection, it is necessary to improve residents' cultural literacy and ecological environment awareness through various means, so that all residents can consciously participate in urban ecological environmental protection activities and can pursue the concept of civilized ecological consumption in residents' lives. As far as the protection of the ecological environment is concerned, it is related to the sustainable and healthy development of the country's economy and society. "To promote its strengths and avoid its weaknesses," on the basis of fully mobilizing the enthusiasm of the market economy participants, the ecological environment protection must be constantly reformed and improved. Measures, start from the particularity of the region and from the opposition and unity of economic development and environmental protection to find an effective way to solve the contradiction and finally achieve a benign interaction between the national ecological environment protection and economic development. The conceptual model of ecological footprint has been proposed for a short period of time, and there are not many cases of applied research in my country. There are still many areas for improvement in this model. From the specific situation of our country, it is necessary to do a good job in environmental protection to ensure sustainable development. Development research pushes to a higher analytical framework.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Hindawi

Retraction

Retracted: The Ecological Consciousness of Natural Writing in British and American Romantic Literature

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] Y. Jin, "The Ecological Consciousness of Natural Writing in British and American Romantic Literature," *Journal of Environmental and Public Health*, vol. 2022, Article ID 8233269, 9 pages, 2022.

Hindawi

Research Article

The Ecological Consciousness of Natural Writing in British and American Romantic Literature

Yanrui Jin (ID)

Foreign Languages Department, Shanghai University of Finance and Economics Zhejiang College, Jinhua, Zhejiang 321013, China

Correspondence should be addressed to Yanrui Jin; z2019114@shufe-zj.edu.cn

The ecological crisis made the British and American ecological literature develop rapidly in the 20th century ecological thought. As a unique literary style that expresses the relationship between nature and man, British and American ecological literature has a far-reaching romantic tradition, and returning to nature is its eternal theme and dream. The study of the romantic tradition of British and American ecological literature has important implications for the development of ecological literature and ecological criticism. British and American romantic writers wrote their own ecological consciousness from three aspects: natural aesthetic and spiritual significance, simple ecological environmental protection consciousness, and life community. They reveal the true meaning of beauty in nature, interpret the beauty of harmony in harmony with nature, advocate returning to nature and the beautiful nature of human beings, and open up a natural path leading to truth, goodness, and beauty for people to pursue their spiritual home. In addition, they also expressed their deep concern for natural resources and the natural environment and called on people to respect life and protect and rationally use natural resources. It highlights that people are not the real masters of the nature, but as an inseparable member of the nature, they form an equal community of destiny with other creatures in the world. The value of British and American romantic literature lies in revealing the deep relationship and mutual influence between human beings and nature and prompting people to comprehend the importance of protecting the ecological environment and living in harmony with nature.

1. Introduction

At the end of the 19th century, due to the changes in nature, human beings began to pay more and more attention to the external living environment, thus generating a new perspective to look at the relationship between human and nature and ecological consciousness [1]. "Ecological consciousness is a special value concept, which is based on the mutual relationship between all ecology and human activities in nature, including itself [2]. It reflects the new relationship between man and nature—the viewpoint and theory of harmony between man and nature and the sum of emotions [3]." Romantic literature lays a foundation for the expansion of modern ecological thought by paying attention to natural beauty, loving nature and returning to nature itself [4]. Therefore,

the romantic tradition of literature has always played a genetic role in the reproduction of ecological thought. British and American romantic literature eulogizes the beauty of nature and writes that nature is an organic and unified whole, which stimulates people's ecological awareness of advocating, integrating, and respecting nature [5]. In the doubt of the rapid growth of the industrial society, under the obvious unreasonable utilization of resources and the pollution of the natural environment, the British and American romantic culture has grown rapidly and produced strong characteristics of the post industrial society [6]. It contains rich and precious environmental awareness information, and reflects the real concern of British and American romantic writers for the natural ecology. Table 1 compares the characteristics of romanticism, realism, and modernism [7].

TABLE 1: Comparison of the characteristics of romanticism, realism, and modernism.

	Background	Features	Represent
Romanticism	From the end of the 18th century to the 1830s, people were deeply disappointed with the "realm of reason" envisioned by enlightenment thinkers and struggled to find new spiritual sustenance	(1) Content: no longer deliberately highlights the rationality of human beings, but deeply explores the emotional world of human beings (2) Style: mainly imaginative ideas and ups and downs	"Notre Dame de Paris" by Hugo, France: "Prometheus Liberated" by Shelley, England: "Germany, a Winter's Fairy Tale" by Heine Deutsche
Reality Lord	After the 1830s, the social contradictions in European and American capitalist countries became increasingly acute	Pays attention to social issues, typically reproduces social features, deeply analyzes the nature of social life, and exposes and criticizes social evils	French Balzac's "Human Comedy"; Russia's Leo Tolstoy's "Anna Karenina", etc.
Modernism	The two world wars, the capitalist world economic crisis in the 1930s, and serious social problems showed the social spiritual crisis	Concentrated self-expression: bizarre creative techniques: Blurred story background, unclear causal relationship, language style deviating from biography	The Old Man and the Sea by Hemingway and Waiting for Godot by Beckett

From the end of the 18th century to the thirties of the 19th century, romanticism was deeply disappointed by the "Kingdom of reason" designed by French Enlightenment philosophers, and tried to seek new spiritual support (1) content: no longer deliberately highlighting human philosophical rationality, but deeply exploring human emotional world (2) style: imagination-based and ups and downs of French Hugo's Notre Dame de Paris; The liberation of Prometheus by Shelley; Heine's Germany, the legend of winter [8]. Nature plays an important role in British and American literature. The development of British and American ecological culture cannot be separated from the new romantic cultural movement at the end of the 18th century and the beginning of the 19th century. It plays a very important role in British and American culture. The appearance of the beauty of art has always been the proof of people's yearning for a harmonious ecological "Utopia." The emphasis on natural beauty in literature itself has also laid a foundation for the expansion of human ecological consciousness. In human ecological culture, natural scenery is the extension of human perceptual existence, and the externalization of human richness and human existence has formed a perfect and harmonious aesthetic order [9]. However, in the era of social development with a relatively long human history, the ecological crisis has been caused by the contradiction between man and nature and the trend of replacing the whole ecological world by human society. For a long time, few people in the literature have reflected on the consequences of human conquest of nature [10]. In the view of romantic writers, nature is the organic integration of man and nature, and nature is the soul of man. Therefore, all cultural exploration and cultural discussion cannot ignore the theme of the post industrial revolution period, which has strong characteristics of the times and the romantic tradition of the British and American ecological culture [11]. British and American ecological literature has far-reaching ideological roots. Although the Western mainstream culture as a whole believes in anthropocentrism and the idea of conquering, transforming, and utilizing nature, we can still find clues to the development of ecological thinking [12]. The romantic tradition of literature has always played an important role in the reproduction of ecological thinking. The "gene" role: The romantic view of nature is based on the industrial revolution of the 18th century and the environmental destruction it caused, and it is the abhorrence of industrial civilization. It liberates people from the shackles of various social customs and social morals, the individual is fully respected, the value identity of the group is abandoned, and the absolute truth of reason is doubted. Therefore, people always see some real images of subjective imagination, such as torrents, cliffs, storms, forests, and strange landscapes. In this respect, Wordsworth has the following expression: "I generally choose the theme of simple and idyllic life. Because in this life, the main impulses of people's hearts have been well cultivated, and they can obtain a more mature psychological state, reduce a little restraint, and speak more concise and powerful words. Finally, it is precisely because in this life, people's passion is a beautiful and eternal form of nature" [13].

2. Theoretical Research

2.1. Romantic Ecology. "Romantic ecology" has now become a term widely used by ecocritics. Looking back at the green research in the British and American circles, outside the academic circle of literary criticism, the earlier research on British and American romanticism under the name of "Romantic Ecology" was the work of American environmental historian Donald Worcester in "Natural Nature." The book Economic Systems: A History of Ecological Thought (1977) [14] was so influential that it was published three times in the 1970s, 1980s, and 1990s. The "romantic ecology" used by the author in this book mainly refers to the ecological thought of American transcendentalist writer Thoreau, as well as the ecological thought of British and German romantic writers. The most direct connection between Romanticism and ecology, according to Worcester, is in the Romantic's way of looking at nature, which is "essentially ecological, that is, he considers relationships, dependencies, and holistic qualities." In addition, both share common subversive/critical goals: "established concepts formed by science," "values and structures of ever-

expanding capitalism," and "traditional prejudices of Western religions against nature" [15].

Therefore, people always see some real images of subjective imagination, such as torrents, cliffs, storms, forests, and strange landscapes. In this respect, Wordsworth has the following expression: "I generally choose the theme of simple and idyllic life. Because in this life, the main impulses of people's hearts have been well cultivated, and they can obtain a more mature psychological state, reduce a little restraint, and speak more concise and powerful words. Finally, it is precisely because in this life, people's passion is a beautiful and eternal form of nature" [16]. Bate takes Wordsworth as an example to reflect on the ecological thinking of romantic poetry, and points out that Fahrenheit does not examine nature from the traditional "enlightenment perspective," nor does the poet regard nature as something that is tamed, controlled, and exploited, but a person. He hopes that through the understanding of nature, readers will find that life is in a system that has a subtle relationship with nature, so as to explore the position of people in this system [17]. Therefore, Bate said that Wordsworth became the first true nature poet in the United States, representing a good and continuous concept of the integration of man and nature. Wordsworth's natural concern is also an environmental concern, and his politics is also a "green politics." In Bate's eyes, this concept of romantic poetry has had a great impact on the subsequent resource conservation movement and has a considerable impact on the current problem of dealing with environmental protection crisis [18]. Figure 1 shows the management system of environmental protection and the measure.

Bett's second work on romantic ecology, "Song of the Earth," still interprets the text in an "ecological context," but the text has expanded to include modern and contemporary works in Britain and America, from Jane Austen to Elizabeth, Bishop, and then to Gary [19]. In this book, Bate reemphasizes that romantic literature's love of nature, strong individualism, and political activism made it suitable for sowing the seeds of the green movement [20]. Bate also reevaluated Wordsworth's aesthetics of the sublime, arguing that the sublime was not egoistic, but ecological. Following Bethe, especially from the mid-1990s when "ecocriticism" came into being, critics in Britain and America developed the study of "romantic ecology". Ecocritics have different emphasis on romantic ecology. These research results have a greater impact, as well as the book "Green Writing: Romanticism and Ecology" published by the British critic James McKusick in 2000. The book uses "ecology in romantic works" to summarize "a new concept of the relationship between man and the natural world" created by the British romantic poets. The most important points of this environmental theory are "species adaptation of habitats", "interconnectedness of all life forms" and "potential catastrophic impact of human intervention on natural systems." It is pointed out in this book that it is these reunderstandings of Chinese romantic poets that have caused a great impact on Chinese environmental writers in the 19th and early 20th centuries. It is precisely this kind of Chinese romantic environment that they are concerned about. Therefore, he put forward the "ecological process review" completely and clearly put forward the viewpoint of China's wilderness areas. Table 2 lists the main ecological problems in my country and the main reasons for the ecological problems. McCusick took Coleridge, Wordsworth, John Clare, William Blake, Emerson, Thoreau, Muir, Mary Austin, and other British and American romantics as righteous poets and writers of nature writing. All are placed in the "green writing" category of "romantic ecology." He also emphasized the inherited relationship between British and American Romantic thought.

So how to define "romantic ecology"? With reference to the abovementioned relevant writings, the author believes that "ecology" in "romantic ecology" does not refer to a scientific theory, but a literary ecological thought. It generally refers to the cultural environment knowledge contained in British and American romantic literature, but it can also be used to explain this concept reflected in other poetic texts. Specifically, the main contents of romanticism ecology are advocating the natural view of organic system and opposing the mechanical natural view. In the author's attitude of respecting nature, there is also the author's ecological ethics spirit of deeply caring for nature; however, the author's creation about nature in the novel does not take the nature as the background but emphasizes the significance of the nature itself, and uses this creation to express his criticism of the ills of modern industrial society, and also shows his positive thoughts on the construction of modern human society.

2.2. Ecocriticism. Environmental Criticism and environmental research are critical concepts. This view began in China in the late 1980s and Britain in the early 1990s. However, as a research field, environmental criticism first occurred in the late 1970s. Nevada Institute, Reno, should be considered as an important cradle of American cultural ecological criticism. The American Society of Western culture, founded in 1965, is also interested in studying Western culture. Michael P. Branch, now a professor of literature and the environment at the University of Nevada, Reno, in his paper "What is Ecocriticism?" presented at the society's conference in the late 1970s, put "ecocriticism." The use of the term dates back to William Rueckert's 1978 "Literature and Ecology: An Experiment in Ecocriticism," which refers to the early 1970s. Writing on the environmental crisis, aiming at applying ecology and ecological concepts to the study of literature, it tentatively highlights the theme of literature and ecology, and William Rueckert is considered to be the first person to use the concept of "ecocriticism."

The terms "ecocriticism" and "ecology" seem to have died down in the field of literary criticism. It was not until the 1989 Western Conference on American Literature that Cheryl Grotferty, then a Ph.D. student at Cornell University, not only revived the term "ecocriticism," but pushed the term to radiate to what had been previously a field called "Nature Writing Studies." Grotferty later became a professor of literature and the environment at the University of
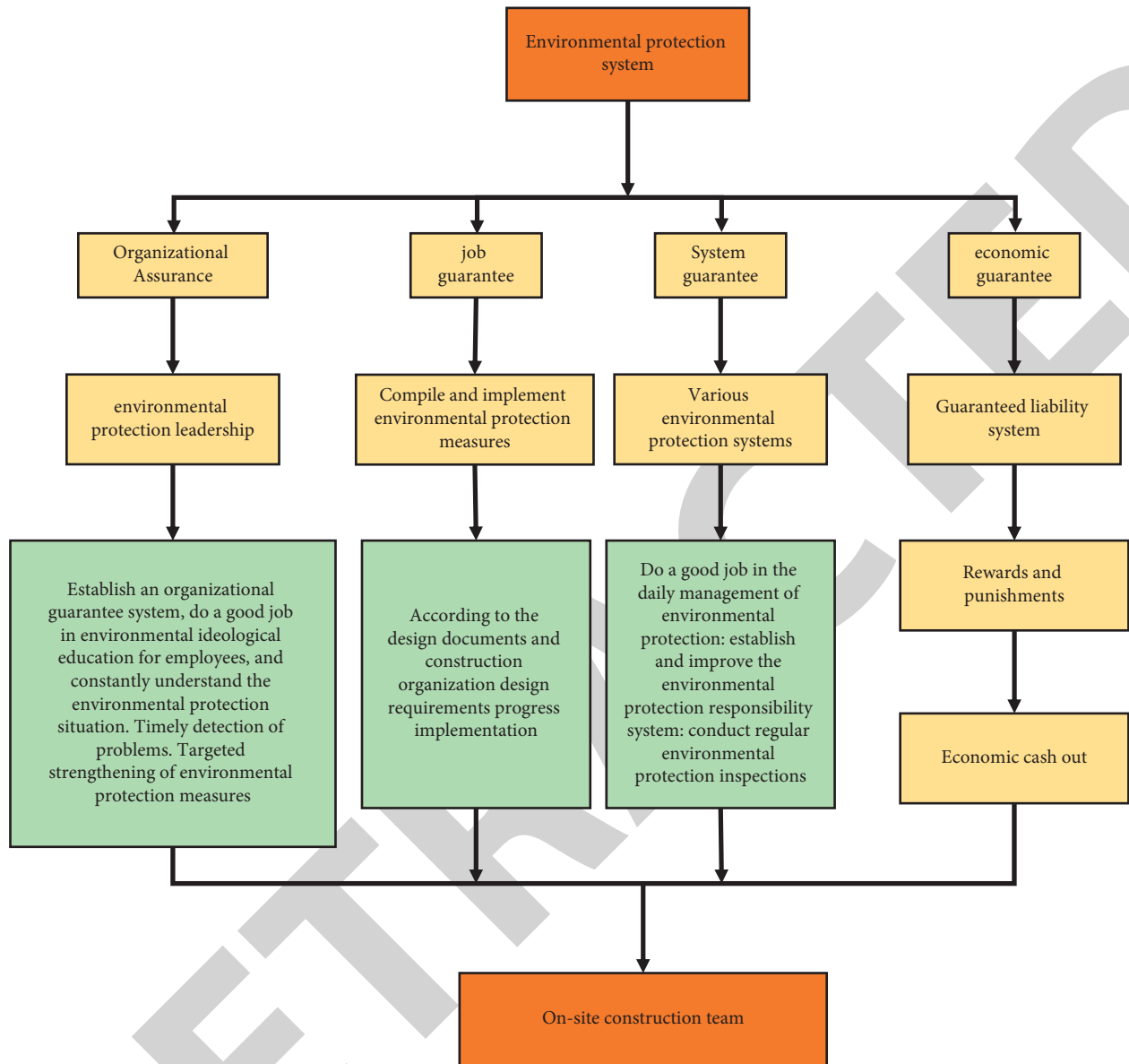
FIGURE 1: Environmental protection system and measures.

TABLE 2: My country's main ecological problems and their causes.

Area name	Major ecological issues	Cause of formation	
A	Deforestation, soil erosion, severe grassland degradation	Natural background	Man-made causes
B	Severely degraded grassland	Semiarid steppe area	Overcultivation, overcutting, overgrazing are serious
C	Severe soil erosion	Less precipitation, drier climate	Serious overgrazing
DE		Warm temperate subhumid areas	Densely populated
F	Major ecological issues	Subtropical hills, abundant rainfall	People live in poverty, overcultivation, overcutting
G		Subtropical hilly and mountainous areas with complex geological conditions	Ecologically fragile due to climate change and human activities

Nevada, Reno, and played a pivotal role in the creation of American ecocriticism. In 1996, she and From co-edited "Ecocriticism Reader: Milestones in Literary Ecology," and she was also one of the main founders when the Literary and Environmental Research Society was established in 1992. Another person who played an important role in the establishment of American ecocriticism was Slovic. He has been a professor of literature and a lecturer of environmental scholars at the University of Nevada, Reno University, and Idaho College. He is also the cofounder of the Chinese literature and Environmental Science Research Association. President, Slovic, has been the founding editor of the journal "Interdisciplinary Research on Literature and Environment" since its establishment in 1993. Thus, through rapid growth, by the early 1990s, China's ecological criticism had formed a brand-new professional type and an effective professional operation mechanism, including professional journals and formal professional institutions. What is interesting is that the American Ecological Criticism movement is mainly generated in the universities in western California, because these schools are often far away from the major academic authorities in the big cities of the United States and the east and west coasts, and more dependent on the good research system and academic atmosphere of the pluralistic and democratic development of the United States.

The ecological comments in the United States are mainly based on environmental culture. Ecological criticism is not a simple theoretical deduction, and environmental culture is also the source of ecological criticism. The ideological origin of ecological criticism can be traced back to three American novelists in the 19th century. They are Emerson, Fuller, and Thoreau. They all sing about nature, the power of life and the wilderness. They are all extraordinary writers. The innovation of Emerson's view of nature is to highlight the loftiness and profundity of nature, oppose the contradiction between man and nature, and advocate the mutually beneficial coexistence of man and nature. As a transcendentalist writer, Emerson emphasized that man communicated with nature through spirituality and believed that human beings could not fully accept the beauty of nature. This positively influenced subsequent environmental literature and ecocriticism in the United States. Figure 2 is an analysis of the problems and measures of how to make people and nature coexist in harmony in building a beautiful China.

3. Analysis of Ecological Consciousness in British and American Romantic Literature

3.1. The Aesthetic and Spiritual Significance of Nature. "Respect for nature" is an important idea in romantic art. Some of the "reverence for nature" stems from human's natural attachment to nature, while others stem from various disadvantages and pressures brought about by the development of industrial civilization. One of the common characteristics of modern English literature and poetry is to use nature as a carrier to express emotions. Wordsworth was a pioneer of modern British romantic culture. He was tired of the noise of the city. From 1799, he retired to his hometown; namely, the nature of the mountains in the lake area has lasted for more than 50 years. Wordsworth believes "Nature has some powers that can make people's hearts infected, and nature will move people with tranquility and beauty, and can lead people to joy. For example, the most ordinary flowers can also inspire people's inspiration, and daisies can teach people to live in Rekindling hope in times of distress, daffodils can heal the wounds of people's hearts." Obviously, Wordsworth did not simply sing the praises of nature, but inspired people's spiritual realm through the description of nature, inspired people's spiritual growth, and sought for human achievement. "The Return of Inner Nature" is the central theme of his poetry.

Wordsworth wrote a lot of romantic idyllic poems in harmony with nature in his life. Natural objects presented an independent aesthetic character in his poems and for the first time truly became the object of human aesthetics. In this way, a new kind of natural gospel and ecological awareness can be embodied. Wordsworth is like a harp that will play harmonious music when the wind blows. The grace and rhythm of all things in nature will knock on the door of his inspiration in time. Acura has naturally become the most important mission of his poetry creation. The world written by the author is naturally a social world integrating human nature and divinity. Wordsworth's ultimate goal is to explore the psychological impact of nature on people through his detailed description of natural scenery. Human life is undergoing great changes in a social order gradually destroyed by traditional rationality, survival methods, and values. Life contains risk, stress, and anxiety. People's original good nature began to weaken slowly. The direct result is that our cultural life is becoming more and more vulgar and impetuous, and materialism and utilitarianism are prevailing. Wordsworth lives in this noisy city. He can only get inner peace by hiding from nature.

Nature "gave him a warm feeling, restored my peace, let me forget the unhappiness of life, and a kind of peace and warmth led me forward." The author is very happy because "I found the nanny of my soul in nature, guiding and protecting the soul of my whole moral life." Industrial civilization has become a way of suppressing and stifling human nature, and people have gradually lost their ability to appreciate the "sunrise and sunset" state of mind. This is a basic spiritual misfortune. Nature is the embodiment of human truth, goodness, and beauty. It can not only purify people's soul but also cultivate people's moral character. Only by respecting nature and returning to nature can people return to the beautiful nature on earth. Figure 3 shows the public participation in the protection of the natural environment in my country. Tinden Abbey can be said to be a new romantic hymn, which embodies Wordsworth's profound meaning of respecting nature, actively integrating into nature, and deeply feeling the great impact of nature on human spirit. In lyrical ballads, Wordsworth wrote a lot of ecological poems to praise the harmonious interpersonal relationship between heaven and man. It requires people to "repair people's discrimination ability, and realize beautiful integration with the universe under the condition of loving and being close to nature." Wordsworth's romantic poetic view of nature expresses his
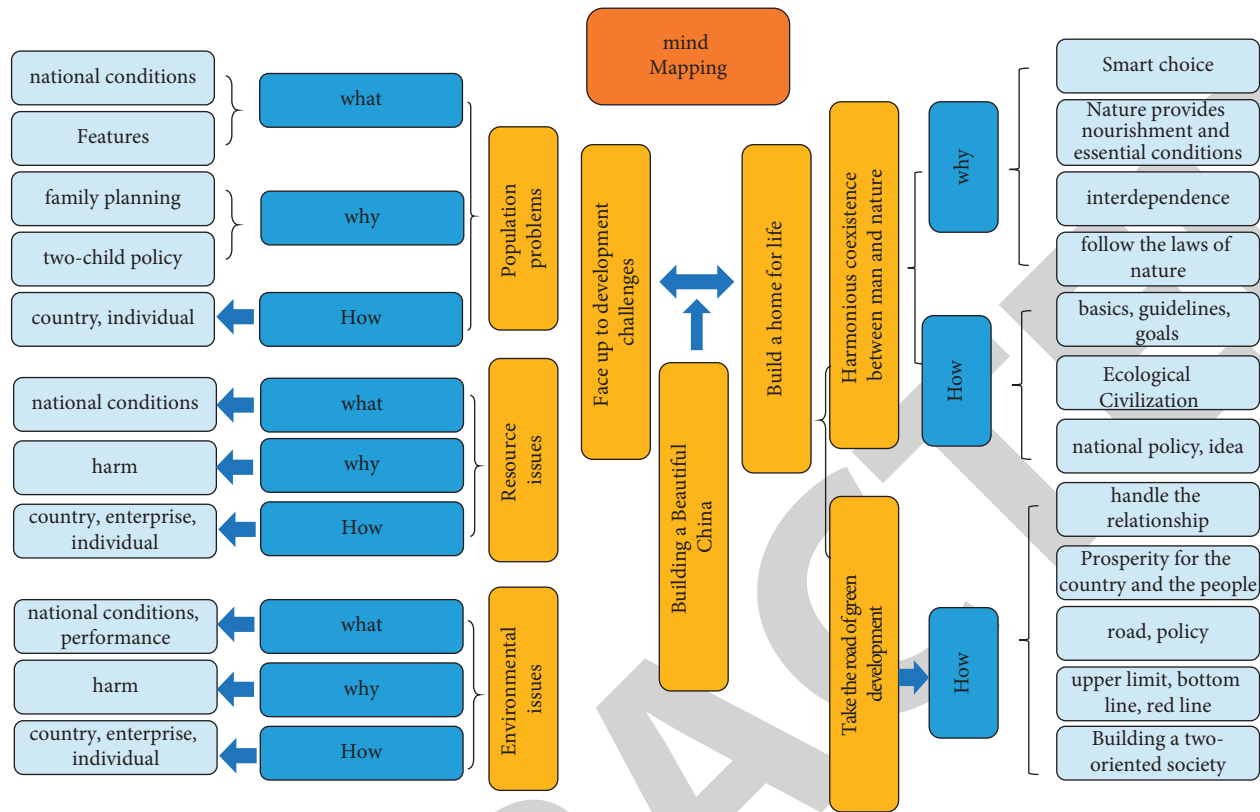
FIGURE 2: Problems and measures for the harmonious coexistence of man and nature.
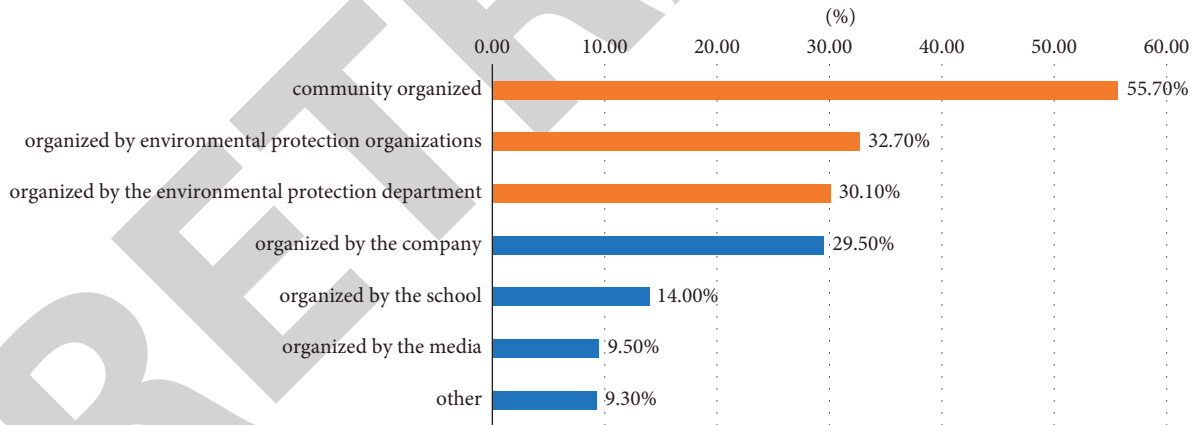
FIGURE 3: Investigation and analysis of the types of organizations participating in public environmental protection activities.

profound philosophical thinking on the relationship between heaven and man, and has profound practical significance.

3.2. Simple Ecological Awareness.

Cooper is known as the pioneer of American literature and the first American writer to achieve worldwide fame. Cooper had an innate affinity for nature from childhood, fascinated by the lakes, forests and legends of the Indians near his home. He roamed the banks of rivers, wandered in forests, observed all kinds of people and things in the world with cold eyes, and thought about the true meaning of life. Bo is the central character and reflects the life of the western frontier of the United States in the "Leather Socks" five parts, namely, "The Pioneers," "The Last of the Mohicans," "The Prairie," "The Pathfinder," and "The Deer Killer." Romance stories are popular. "Leather Socks" Nati Bangpo lives in the virgin forest, abides by forest laws, is familiar with hunting skills, respects nature, respects all life in nature; as a hunter, he said frankly: "In my opinion, if the first deer, it's a sin to shoot the second deer before it's finished eating." He had a dignified demeanor and was devoted to nature. When he saw Lin Ru and God, he fled all the way to the west, trying to stay away from the axe of

civilized villages and towns. Cooper hopes that his works can represent "the reality of early human civilization." He reflects the mysterious native forests, rivers, creeks, cliffs, mountains, cliffs, and huge waterfalls in western California, and connects the appearance of the wild world with the life of primitive forest residents in the nature. The story unfolds according to this description: "in a huge mountain near the center of New York State, the undulating peaks and occasional stones add color to the original romantic and picturesque scenery. The river flows through the long, fertile mountain streams. Everywhere is full of vitality." In addition, it also shows the man-made landscapes that prove the historical value of the American frontier, such as the British colonial fortress and the dome cement houses carefully built by the Indians. These mud houses are flanked by lakes or built in water. The work contains a simple and strong North American flavor, showing a picture of natural ecological harmony that has not been invaded by industrial civilization, and is full of the beauty of natural harmony of the original ecology. Table 3 shows the ecological protection measures adopted by my country for different ecological systems.

4. "Community of Life" in British and American Romantic Ecology Literature

Emerson's transcendental view of nature has influenced many American writers. Thoreau, the pioneer, is one of the greatest ecological novelists in the post romantic literature period. Walden lake is a classic work written by Thoreau, a scientific pioneer, based on his living experience in the primeval forests of the United States. The main idea of Walden lake is to explore knowledge about the relationship between his life and nature. In this book, the description of nature is also very rich. It is the pinnacle of Thoreau's ecological thinking and an important milestone in the history of American literature. His exquisite and unique natural ecological theory has greatly inspired future generations. British nature critic Boyle once pointed out: "Thoreau showed us a kind of non-human existence, a survival beyond other members of the world, and showed the significance of all existence in the great nature, including the human body." Thoreau was alone in living in the virgin forest on the banks of Walden Pond, surrounded by towering ancient trees, green lake water, birds, and beasts, is a primitive scene. It is no wonder that Emerson compared Thoreau to the simple and straightforward Adam, which is very vivid. In "Walden," Thoreau expounded two aspects of content, one is all things in nature, and the other is that modern people should return to simplicity and nature. Thoreau once said in Walden Lake: "I went to the jungle because I wanted to live in a free and simple way. Only facing the most real things in life, it depends on how I can understand what life means to me. Only in this way, when I die, I will not find that I have not really lived. I want to live deeply and absorb the vitality of life." Figure 4 shows the 2010–2020 scholars studying Thoreau and the trend of man and nature development.

From ancient times to the present, human beings have always been looking for the meaning of life and life. Thoreau took a road of returning to the pure life of human primitive

TABLE 3: Conservation measures for different ecosystems.

Ecological zoning	Environmental element status			Utilization and protection measures
	Atmosphere	Waters	Soil vegetation	
Crisis zone	x	x	x	Development should be completely limited and no human pressure should occur, and comprehensive nature conservation measures should be implemented
	±	x	x	
	x	±	x	
Unfavorable zone	x	x	±	Development should be limited, and human pressure should be reduced for unfavorable environments, and targeted natural protection measures should be implemented
	x	±	±	
	±		±	
	±	±		
	−	−	−	
Stable zone	−	−	+	To stabilize artificial pressure on environmental claims and implement natural conservation measures applicable to them
	−	+	−	
	+	+	+	
	−	+	+	
Favorable area	+	−	+	Limits of anthropogenic pressure need to be specified, and natural conservation measures determined as needed
	+	+	−	

times. Although that kind of life may seem rough or even very simple, it is precisely the way that is closest to nature and the best way to make people feel the existence of life. Human life is connected with nature, but it is always an important part of nature. Human life always shares the beauty of nature with the sun, moon, and stars. All human activities that deviate from nature are violations of human nature. Like other thinkers, Thoreau was also closer to nature and liked nature more, and he was more sensitive to the power and influence of nature.
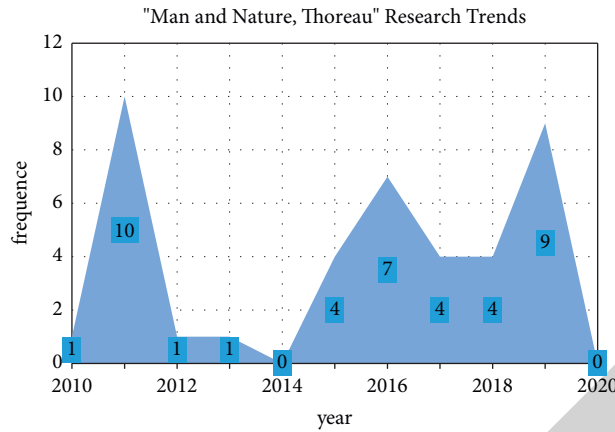
FIGURE 4: The research trend of Thoreau's "man and nature."
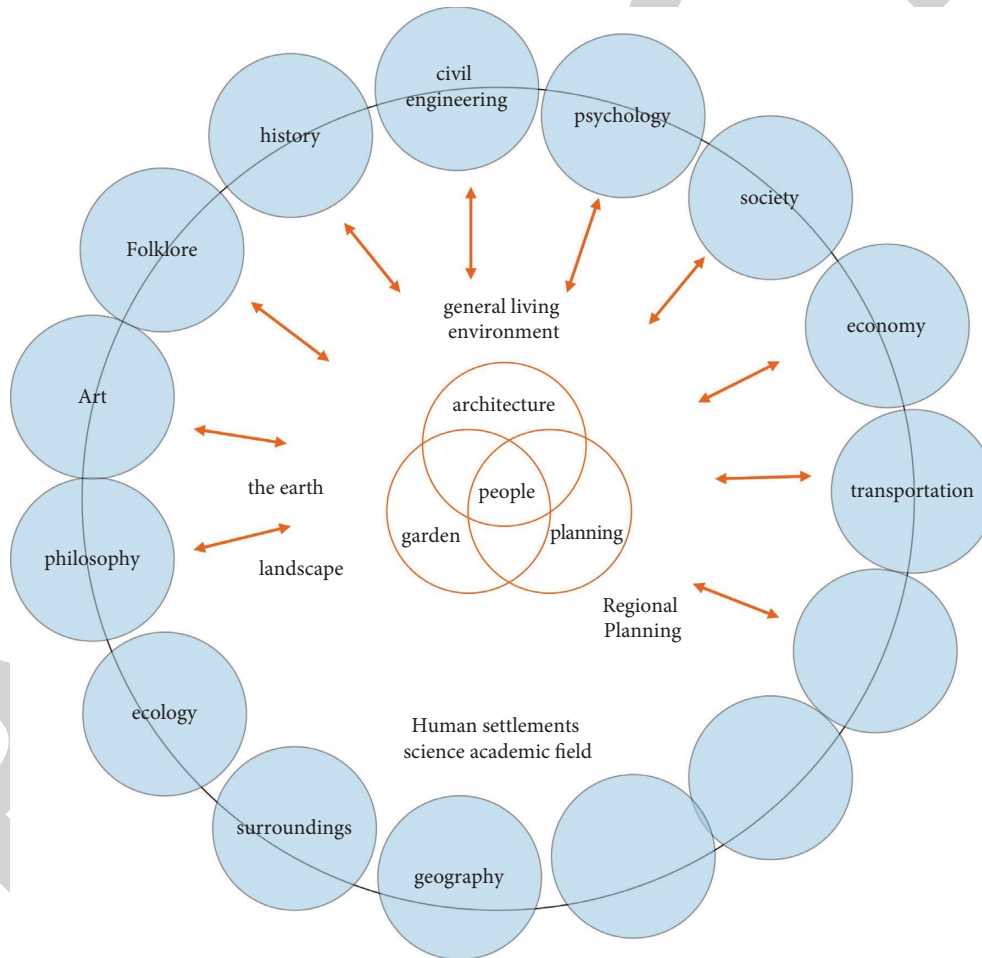
FIGURE 5: The connection between man and nature in a broad sense.

This experience had an important impact on the maturity of Thoreau's thinking. In the process of implementing Emerson's Transcendentalism, Thoreau further developed the transcendental natural science concept into a real biological and ecological consciousness. As a person who loves and values nature, he further clarified that man is not the real master of nature. Compared with anything, human beings are inseparable members in nature, and together form an equal survival community of the universal blood family, as shown in Figure 5. The connection between man and nature in a broad sense. Thoreau believes that the modern people's wanton plundering of resources has made people gradually lose their

Research Article

Optimization of Management Structure and Resource Coordination Management Method of Construction Enterprises under Urban Environmental Pollution

Yan Xing [ID]

College of Urban Construction, Hebei Normal University of Science & Technology, Qinhuangdao 066004, China

Correspondence should be addressed to Yan Xing; xingyan2756@hevttc.edu.cn

The construction industry is an important pillar industry in China. It not only promotes the development of China's industry but also promotes the progress of society. It can be said that it has made great contributions to the development of China's economic construction. Issues such as sustainable development, green health, resource conservation, and environmental protection have become the most discussed topics, and it is imperative to implement green building management in the construction industry. Therefore, China has put forward the development concept of "green building," which puts the management of green building on the basis of traditional building, and pays more attention to the goal of energy saving, environmental protection, people-oriented and green innovation. By studying the optimization of the operation structure of construction enterprises and the coordinated management of resources under urban environmental pollution, this study first observes the current situation of the construction industry this year and finds that the number of green building evaluation and identification projects in China is increasing year by year. Through in-depth analysis of management structure optimization and resource coordination methods, it is found that the first-level indicators have the largest weight in resource coordination management (E), followed by operation management (D), enterprise mechanism (A), talent quality (B), and management performance (C). The secondary indicator energy system planning and utilization (E2) has the largest weight value, followed by renewable energy utilization (E3), employee qualification rate (C1), waste management (D3), greening management (D2), energy conservation management (D1), main building energy conservation (E1), the impact of energy consumption on the environment (E4), management system (A1), corporate culture (A3), employee capability (B2), product quality pass rate (C3), intelligent system Management (D4), key brain drain rate (C2), talent atmosphere (A2), and employee quality (B1). Lastly, the first-level indicators have an impact on the operation structure of construction enterprises. The calculation results of the parameters are obtained to understand the impact of resource coordination management (E) on the operation of construction enterprises. In terms of enterprise mechanism (A), corporate culture (A3) and management system (A1) are relatively important reasons for affecting industrial resources; on talent quality (B) in terms of employee ability (B2), it has the greatest impact. Enterprises should pay attention to the introduction of talents and improve the comprehensive ability of employees. In terms of management performance (C), construction enterprises should train employees to improve their qualification rates. In terms of operation management, construction companies should pay attention to product quality (D), improve and optimize green buildings, and follow national policies and long-term development; in terms of resource coordination management (E), construction companies should continue to deepen the concept of green buildings, and at the same time strengthen the recyclability of green building materials and equipment, and the concept of recycling is still constant.

1. Introduction

Taking the recycling of construction waste in Central China as an example, this paper comprehensively studies the recycling of construction waste in developed regions (Europe and the United States). First, damage caused by urban construction waste polluting the environment was identified. Then, the environmental pollution caused by urban construction waste is analyzed, and the reasons for the obstacles to recycling and utilization of urban waste are

summarized. Finally, the recycling measures for urban construction waste are put forward. The results show that the United States, Japan, and Germany have higher recycling rates of construction waste. The pollution of urban construction waste to the environment is reflected in the large-scale occupation of land resources, resulting in aggravation of household water, soil, and air pollution. The large amount of waste generated by large-scale urban construction and the low comprehensive disposal rate of construction waste are two aspects of urban construction waste pollution at present. The main reasons for the low recycling rate of urban construction waste are the lack of supporting laws, regulations, and industrial policies, the low market share of construction waste recycling products, poor coordination of key nodes in the industrial chain, and low operational efficiency. The research conclusions provide a good benchmark for improving the overall level of urban construction recycling development, promoting the sustainable development of construction waste recycling industrialization, and formulating construction waste recycling development policies and plans in other regions of China [1]. Based on the environmental statistics from 1992 to 2008, the changing trend, types, causes, and direct economic losses of domestic environmental pollution accidents were analyzed, and the risk areas of water and air pollution accidents were investigated using the SuperMap. The results show that the number of environmental accidents in 1994 was at most 3,001, and in 2007, the number was at least 462. The frequency of pollution accidents has decreased, especially after 2006. The most important accident types are all 54.3% and 34.2%. Pollution accidents are mainly production safety accidents and chemical transportation accidents, accounting for 30.8% and 26.9%, respectively. The heavily polluted areas are in the southeastern and central regions of China. Water and air pollution incidents occurred frequently in Guangxi, Hunan, Sichuan, and other places, and water pollution incidents in Zhejiang, Jiangsu, Guangdong, and other places occurred frequently. The direct economic losses caused by accidents mainly come from major accidents related to water pollution. Finally, recommendations are made for accident prevention and management [2]. The link coordination degree model is used to determine the coordination degree of environmental regulations, technological innovation, and green development. The city is divided into three systems: backward in the green economy, backward in environmental monitoring, and backward in technological innovation. Grey relational analysis is used to investigate factors influencing the development of the system. The three major eastern coastal cities, represented by Qingdao and Weihai, are well coordinated, while the development level of scientific and technological innovation, which is a key factor in the coordinated development of cities, is the lowest in Shandong Province. Grey correlation analysis shows that the development of green economy in backward cities has an impact on the level of economic development and foreign economic development; the impact of urban pollutant emissions is greater than the expenditure on pollution reduction when environmental regulation lags behind; the government's emphasis on personnel training is the

technological innovation of backward cities. Based on these factors, recommendations for optimal urban development and coordinated regional development are formulated [3]. Urban environmental pollution and its governance are one of the issues that need to be explored in the development of modern cities. How to use relevant theories to analyze the current situation and causes of urban pollution, study pollution prevention, and control countermeasures, and achieve the coordination of urban development is of great significance and feasibility for the development of China's urban environment [4]. Shanghai's current environmental management framework, built on a post-transition socialist economy and spectacular urban renewal, has succeeded in reducing severe industrial pollution and improving urban facilities in unprecedented ways. However, it generally does not consider issues such as social and environmental justice. Based on Holden's sustainable urban development model, four priorities and five principles for Shanghai's future environmental management under the fair and shared city model are proposed, and their policy implications and implementation issues are briefly discussed. Horton's approach is relevant to the Shanghai case because he believes that the principle of multidimensional justice is central to the concept of sustainable development [5]. Systematic research is being carried out on the environmental pollution caused by the engineering structures ubiquitous in Chinese cities. Combined with the construction practice and the concept of environmental pollution control, a comprehensive method to prevent and control this problem and a calculation method of the Environmental Pollution Index (EPI) are proposed. Combined with the EM ISO14000 series of standards and relevant Chinese regulations, a civil engineering environmental pollution management system has been established [6]. The environmental pollution risk management assessment of Musayyib Power Station defines the coordination degree and response methods of the competent authorities in the field of environmental pollution monitoring. For research purposes, 150 individuals with no probability were selected as a sample, and a two-part questionnaire was used to collect data; and including demographic data and environmental pollution risk management, a total of 26 papers were collected. Local governments collect data from power plant workers and analyze it using applied statistical, descriptive, and inferential methods. The results showed that most of the participants were in the age group (25–35 years old) and most of them were male. In the field of education, most of them are formally graduated and work in administrative jobs without training in this area. Likewise, the results describing the results (70.7%) disagreed with the fact that there was a risk of environmental pollution, and there was a significant relationship between risk management and the level of education and training of the participants [7]. The time series data of Hefei City were selected from 2007 to 2014, and the objective weighting method was used to calculate the weight of the six indicators of urban pollution, and to examine the impact of urbanization on urban pollution. According to the results of the data stability test, a nonlinear model of the relationship between population urbanization and urban

environmental pollution is established. The quadratic regression model fits well, and the intensity ratio also increases, indicating that there is a strong positive correlation between the two variables. Further regression analysis shows that the impact of population urbanization on urban environmental pollution is more obvious. Compared to the EQR curve, it shows the reason for the lack of an "inflection point" in the urbanization process. Finally, some suggestions are put forward on how to realize the coordination of population urbanization and urban environmental protection in Hefei in the future [8]. In order to strengthen the guarantee function of safety management organization for production safety and improve the safety level of construction enterprises, by analyzing the disadvantages of traditional construction enterprise safety management organization structure in technical practice, and carrying out structure-based optimization methods, the modern enterprise organization theory is put forward. The degree of orderliness is used as an indicator for evaluating the organizational structure of safety management. Time yield entropy and quality entropy are considered two dimensions of evaluation. Based on the entropy theory, an evaluation model of the order degree of the safety management organization structure is established. Take a state-owned enterprise as an example. By comparing the organizational structure of safety management with the degree of order before optimization, the method of the optimization scheme is verified. The results show that the orderly and optimized safety management organizational structure has been significantly improved, and the optimized safety management organizational structure has obvious advantages over the original organizational structure [9]. Environmental pollution and resource scarcity are two major challenges facing the world today, and the development and utilization of precious metal resources are one of the effective strategies to deal with these problems. Known for their high performance and scarcity, precious metals are essential in today's life. As a non-renewable resource, the demand and consumption of precious metals are increasing year by year. Therefore, it is imperative to develop eco-efficient precious metal recovery technologies to alleviate the environmental and raw material crisis. This perspective summarizes some common precious metal recovery strategies, focusing on innovations from traditional technologies. The above methods are evaluated and tested in terms of secondary pollution and recovery efficiency [10]. Given the conflicting nature of the resource and environmental issues, a new approach is needed. In this context, finding common ground and cooperation is expected to become a paradigm for conflict resolution. Economists can help design institutions that promote these paradigms. In order to control pollution, the common ground paradigm states that polluters and victims jointly decide emissions, pollution control, and financing. For pollution management, a new policy tool is proposed, including taxes, subsidies, and cost-sharing. Using this tool, the coordination process involves the Consensus between polluters and victims. The decision to discharge and reduce pollutants [11]. Use the VAR model to analyze the relationship between data stability, economic growth, and

environmental pollution: emissions to the atmosphere, industrial sewage, and industrial solid waste. Solid waste the impact of industrial waste and the discharge of industrial waste in flue gas has been delayed, but it is still related. The increase of SO_2 affects economic growth to a certain extent, but it does not rule out that the government will play a role in the production process, industrial solid waste, industrial wastewater discharge, etc. The degree of supervision and innovation in aspects of the city. The impact of emissions on GDP is not significant [12]. Based on the location of urban road construction dust pollution sources and the optimization of urban road construction dust pollution emission reduction efficiency, an urban road construction dust source distance detection model was developed. Urban road construction uses remote sensing image technology to detect dust pollution of urban road structures, perform multi-level and multi-directional segmentation of remote sensing images, and use spatial block area matching to demarcate the visual features of suspicious buildings. The simulation results of the location of dust pollution sources in expressway construction show that this method is more intelligent and accurate in the positioning of urban dust pollution sources, and solves the problem of large errors in traditional manual positioning [13]. The environmental ratio quantifies the evolution of each industry and its impact on the environment. The evolution of the industrial structure has had a significant impact on these natural ecological environments, and the optimization of the industrial structure has not changed the dependence on natural resources and the ecological environment, so the research field should optimize the industrial structure, and improve the industrial structure. The utility effect of natural resources reduces various types of pollution and limits the impact of industrial structure buildings on the ecological environment [14]. Real-time dynamic optimization method of construction project progress based on lean construction the method is based on the process of construction companies Reengineering and Lean Supply. The newly proposed lean forecasting method uses multiple linear regression, back-propagation artificial neural network, and learning curve; considering the limited resources and constant project duration, the real-time dynamic programming optimization method adopts the resource-based concept. An intelligent schedule is a developed management system to optimize the progress of construction projects in a timely and efficient manner. The initial schedule can be programmed, and the dynamic real-time schedule can be optimized and displayed in Gantt charts, network charts, and spatiotemporal line charts [15].

2. Management Structure Optimization and Resource Coordination Management of Construction Enterprises under Urban Environmental Pollution

2.1. Current Status of Environmental Protection Management. Through the research and analysis of relevant civil engineering cases, it can be concluded that many construction units do not pay attention to environmental management

when carrying out construction operations. Therefore, the adverse effects of construction are becoming more and more serious, and problems such as noise pollution cannot be truly solved. Affected by various aspects, the living conditions of urban residents have deteriorated sharply, and the construction units cannot achieve the expected economic benefits. During the construction of engineering structures, there are some water, air, and noise-related nuisances. These pollution problems pose a serious threat to the urban environment and negatively impact human health. Although construction units have begun to pay attention to environmental management in civil construction, their environmental management is not perfect due to various practical factors. Among them, lack of advanced environmental management techniques of the construction unit is an important reason affecting its project progress. In the process of governance and prevention of building pollution problems, the full function of pollution control equipment is more important. Today, most construction units mainly use old-fashioned cleaning equipment when dealing with pollution problems. The efficiency of these devices cannot meet the actual needs of the current pollutant purification work, so the purification work efficiency is low, as shown in Figure 1.

Many construction units do not pay attention to environmental protection management when carrying out construction work. As a result, the adverse effects of its construction have become increasingly serious, and problems such as noise pollution cannot be truly solved. Under the adverse effects of various aspects, the living conditions of urban residents have declined significantly, and construction units have therefore not been able to obtain the desired economic benefits. In the process of treatment and prevention of pollution problems in civil construction, whether the functionality of the equipment used for pollution treatment is complete occupies a larger position. At present, most construction units mainly use old-fashioned treatment equipment when dealing with pollution problems.

2.2. Characteristics of Urban Environmental Pollution Caused by Construction Products.

Urban construction waste is often mixed with urban domestic waste. The pollution of urban domestic waste is dominant. Ordinary people can feel it with the help of sight and smell. Construction waste usually does not directly cause people's sensory response, which weakens people's perception of it. The city's cognition and awareness of the hazard of construction waste often lead people to ignore the specific impact of construction waste. In addition, the secondary characteristics of urban construction waste transportation cause the environmental impact of urban construction waste to be temporary. Small new buildings have a limited environmental impact as the number and size of buildings increase, and serious ecological and environmental problems often become more apparent. When distinguishing between construction and finishing materials, some products may contain large amounts of hazardous substances such as paints and coatings, and the release of these toxic substances has a lasting impact on the environment. Construction sites are easily polluted during the transportation of building materials and have the characteristics of large impact and large area. Building products can cause different levels of environmental pollution, from the production of building materials to the use and scrapping of building products. Sudden environmental pollution occurs when hazardous substances leak into building materials; when buildings collapse due to earthquakes, strong winds, and heavy rainfall, or when building products are dismantled at the end of their useful lives. Dusty materials (cement, lime, etc.), broken packaging bags, flying dust, paint and other materials, and fire will concentrate the harmful substances in the evaporation of paint, which will severely pollute the environment. It is shown in Figure 2.

(1) Extensive
(2) Ambiguity
(3) Hysteresis
(4) Sudden
(5) Durability

2.3. Optimization of Construction Enterprise Management Structure under Urban Environmental Pollution.

The competent department should first adjust the work attitude and realize the positive impact of environmental management during the construction period on the urban environment. After the relevant departments inform the relevant environmental protection staff, they should continue to increase publicity efforts so that all staff on the construction site can recognize the importance of effective environmental management to the construction unit and society. In the process of proper environmental protection publicity and education, environmental protection workers can put up advertising posters on the construction site. The advertising content should focus on the harm of construction pollution to urban residents, the environment and civil engineering, and let more construction workers explain the importance of its implementation. Relevant environmental management personnel should actively learn more advanced and effective environmental management technologies, and use these technologies to improve and optimize their own environmental management in civil construction. When carrying out appropriate management work, effective management of building materials for civil buildings can reduce the pollution of the building environment to the urban environment to a certain extent. Relevant construction units should strictly control the quality and safety of building materials to ensure that the building materials they use meet national requirements. Construction units actively use building materials that are compliant and less polluting, which to a certain extent helps to effectively control pollution sources in the structure. When carrying out work in the field of environmental protection management, relevant construction units must strictly abide by the legal requirements and standards related to environmental protection management. At the same time, the environmental protection management workflow should be explained in detail in the bidding documents when the project is tendered and tendered,
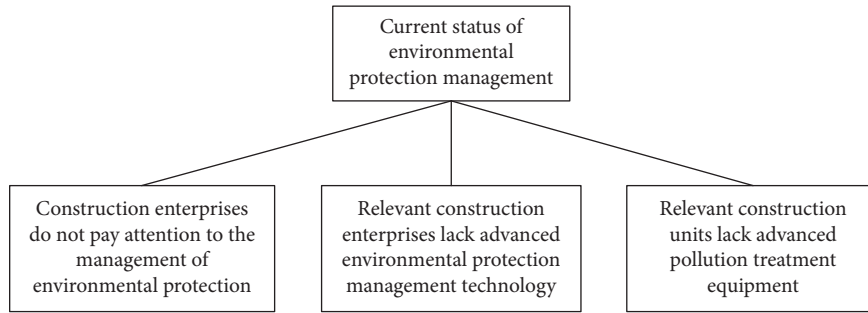
FIGURE 1: Current status of environmental protection management.
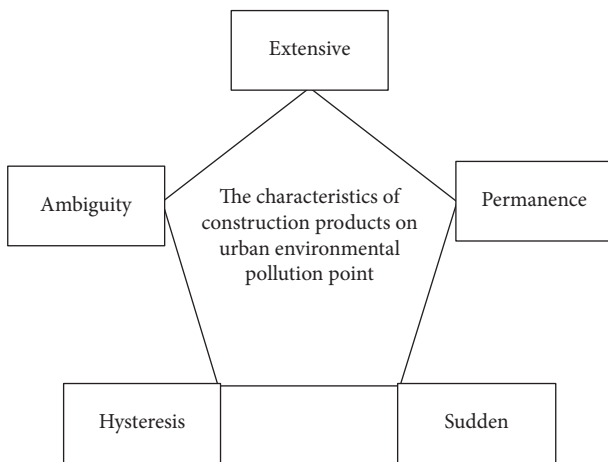
FIGURE 2: Characteristics of urban environmental pollution caused by construction products.

FIGURE 3: Optimization of construction enterprise management structure under urban environmental pollution.

and the relevant departments should be asked to supervise. This kind of behavior can enhance the self-management awareness of civil engineering units and make them restrained in further environmental management work. Self-control is also important in the supervision of environmental management. When managing construction materials and civil engineering pollutants, relevant personnel should ensure that their materials and equipment comply with environmental management requirements. At the same time, avoid the use of outdated equipment or highly polluting building materials, so as not to exacerbate the urban pollution problem, as shown in Figure 3.

(1) Strengthen environmental protection publicity for the company's personnel, so that the environmental protection awareness of all employees can be improved;

(2) Optimizing the implementation strategy of environmental protection management;

(3) Learn advanced environmental protection management technology and continuously introduce new equipment;

(4) Effectively supervise the environmental protection management process.

2.4. Coordinated Management of Resources under Urban Environmental Pollution. Analyze and solve the contradiction between resource development and urban construction from the perspective of sustainable development. Resource development must adapt to the carrying capacity of the environment in order to form a vicious circle and achieve sustainable development. This requires the formation of a vicious circle of urban construction, environmental protection, and resource conservation in the process of developing urban resources to create conditions for long-term development. The circular economy is an economic growth model based on resource efficiency and reuse, based on the principle of "resource reduction, reuse and utilization," with low consumption, low emission, and high efficiency as the core features are the resource-based city. In order to build a harmonious society and achieve sustainable and healthy development, Huolin Gol City must take the concept of circular economy as the guideline for the next few years, formulate special plans for circular economy development, promote circular economy plans, and formulate and implement circular economy promotion plans for local economy. They should also develop laws and regulations and preferential policies for finance, taxation,

etc., guide and support the development of circular economy, and strengthen the comprehensive utilization of resources and the utilization of circular economy in terms of resource extraction, production and consumption, and waste and social consumption. From the past one-way linear "resources, products, waste" mode to the "resources, products, renewable resources" multidirectional circular economy mode, sustainable development realizes the preservation of resources, products, and renewable resources, and realizes the "mutual promotion and win-win" of economy and environment.

The classification, recycling, and reuse of construction waste is an optimized plan for material-saving measures. The green construction of construction projects should focus on environmental protection, water saving and water resource utilization, conservation and material resource utilization, energy saving and energy utilization, land conservation and land resource protection, etc. Five aspects are evaluated in such an approach. In order to avoid the situation that the supervision is not in place in the project, corresponding measures are formulated to strengthen the supervision of each link.

3. Experimental Models

3.1. Analysis Method of Grey Relational Degree. Due to the different units of measurement for each factor and the different sizes and orders of magnitude of the original data, the different sizes and orders of magnitude are not easy to compare, or it is difficult to draw correct conclusions when comparing. Therefore, the raw data is usually subjected to dimensionless processing before the correlation is calculated.

Since each factor has different units of measurement, the original data have differences in dimension and order of magnitude. Different dimensions and orders of magnitude are not easy to compare, or it is difficult to draw correct conclusions when comparing. Therefore, before calculating the correlation degree, the original data is usually subjected to dimensionless processing.

The initialization is to remove all subsequent data from the first data using the same sequence to obtain multiple sequences of each data relative to the first data. In general, the baseline method is suitable for underestimating relatively stable socioeconomic phenomena, since most of such series are suitable for stable upward trends, and the treatment of the baseline values can make the upward trend more pronounced. For example, the launched series includes a dynamic development rate index commonly found in socioeconomic statistics. The general formula is:

$$y = \frac{x_i}{x_0}. \tag{1}$$

The determination is to first get the mean of each original series, and then divide all the series data by the series mean to obtain multiple series of dynamic means for each data pair. Generally speaking, the averaging method is more suitable for data processing without obvious upward and downward trends. The general expression is:

$$y = \frac{x_i}{\overline{x}}. \tag{2}$$

To cite a reference series refers to a data system used as a standard or basis. It can be dynamic or static. Let the reference number column after data processing be:

$$\{x_0(t)\} = \{x_{01}, x_{02}, \cdots, x_{0n}\}. \tag{3}$$

The P number sequence structures compared with the reference sequence structure are:

$$\left\{ x_1(t), x_2(t), \cdots, x_n(t) = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ x_{p1} & x_{p1} & \cdots & x_{pn} \end{bmatrix} \right\}_{p \times n}. \tag{4}$$

In formula (4), x-data value, i-the ith object, t-period t, j-jth indicator; when $i = 0$, x_{ij}-comparing each data of the sequence, p-th p objects, n-the data length of the sequence, that is, the number of data.

X-data value, i-the ith object, t-period t, j-jth indicator; when $i = 0$, x_{ij}-comparing each data of the sequence, p-th p objects, the n-the data length of the sequence, that is, the number of data.

Calculate the absolute dispersion value: record the absolute value of the difference between the value of each period of the k-th comparison sequence ($k = 1, 2, ..., P$) and the corresponding period of the reference value sequence as:

$$\rhd_{OR}(t) = |x_o(t) - x_R(t)|. \tag{5}$$

For the k-th comparison sequence, record the minimum and maximum numbers of $n \rhd_{OR(t)}$ as $\rhd_{OR}(\min)$ and $\rhd_{OR}(\max)$, respectively. For the P comparison columns, the smallest of the $P \rhd_{OR}(\min)$'s is $\rhd(\min)$, and the largest of the $P \rhd_{OR}(\max)'$s is $\rhd(\max)$. In this way, $\rhd(\min)$ and $\rhd(\max)$ are the smallest and largest of the absolute values of all P comparison sequences in each period, respectively. Obviously,

$$\Delta(\min) = \min_j \left[\min_i \Delta_{OK}(t) \right], \tag{6}$$

$$\Delta(\max) = \max_j \left[\max_i \Delta_{OK}(t) \right]. \tag{7}$$

Calculation of correlation coefficient: According to the theory and method of grey correlation analysis, the correlation degree between the k-th comparative sequence and the reference sequence in period t can be calculated by the formula:

$$\zeta_{OR}(t) = \frac{\rhd(\min) + \rho \rhd(\max)}{\rhd_{OK}(t) + \rho \rhd(\max)}. \tag{8}$$

Calculate the degree of association, and then calculate the degree of association between the ith evaluated object and the optimal reference sequence according to formula:

$$r_i = \frac{1}{p} \sum_{j=1} \zeta_{ij}. \tag{9}$$

The formula for calculating the comprehensive evaluation coefficient Ei is:

$$E = ir_i \times 100. \tag{10}$$

In fact, Ei has the same meaning as relevance r_i. The scale factor is set to 100, just to be consistent with people's accustomed grading method.

Since r_i reflects the degree of correlation between the ith evaluated object and the standard evaluation sequence x_{0i}, if $Ei > Ej$, it means that the ith sample is better than the jth sample. Therefore, according to $\{Ei\}$, the objects to be evaluated can be sorted and comparatively analyzed.

(1) Determine the reference sequence;

(2) Perform dimensionless processing on the actual value of each indicator;

(3) Find the two-level maximum difference $\Delta(max)$ and the two-level minimum difference $\Delta(min)$;

(4) Calculate the correlation coefficient and correlation degree

(5) Calculate the comprehensive evaluation coefficient Ei;

(6) According to $\{Ei\}$, the objects to be evaluated can be sorted and comparatively analyzed.

3.2. Principal Component Analysis.

First, an evaluation index system is established according to the content, and the variable matrix X of the index system is established, which is composed of n questionnaire samples and p index samples. The matrix form is as follows:

$$X = \begin{bmatrix} X_1^T \\ X_2^T \\ \vdots \\ X_N^T \end{bmatrix} = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1p} \\ x_{21} & x_{22} & \cdots & x_{2p} \\ \vdots & \cdots & \cdots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{np} \end{bmatrix}. \tag{11}$$

In order to eliminate the influence of the dimension and order of magnitude of the original data, the indicators are usually dimensionless, and the Z-score method is commonly used as follows:

$$Z = \frac{(x_{ij} - \bar{x}_j)}{\sqrt{\mathrm{var}(x_j)}}, \quad (i = 1, 2, \ldots, n; \; j = 1, 2, \ldots, p). \tag{12}$$

Get the normalized data array:

$$Z_{ij} = (Z_{ij})_{n \times p}. \tag{13}$$

The sample values are:

$$\bar{x}_j = \sum_{i=1}^{n} \frac{x_{ij}}{n}. \tag{14}$$

The sample variance is:

$$\mathrm{var}(x_{ij}) = \frac{\sum_{i=1}^{n}(x_{ij} - \bar{x}_j)^2}{(n-1)}. \tag{15}$$

Finding the correlation coefficient matrix of the standardized data, let $r_{ij} = 1/n - 1 \sum Z_{ij} \times Zij$, namely,

$$r_{ij} = \frac{1}{n-1} \times \sum_{i=1}^{n} \left[(x_{ij} - \bar{x}_j)/\sqrt{\mathrm{var}(x_j)} \right] \left[(x_{ik} - \bar{x}_k)/\sqrt{\mathrm{var}(x_j)} \right]. \tag{16}$$

These have to be

$$R = (r_{ij})_{p \times p}. \tag{17}$$

Since $r_{jj} = 1$; $r_{ik} = r_{ki}$ that is, R is a symmetric matrix, all elements on the diagonal are 1.

Since $r_{jj} = 1$; $r_{ik} = r_{ki}$ so R is a symmetric matrix, all elements on the diagonal are 1.

From the characteristic equation $|\lambda I_P - R| = 0$, p characteristic roots can be obtained:

$$\lambda_g = \{\lambda_1, \lambda_2, \cdots, \lambda_p\} \, (g = 1, 2, \ldots, p). \tag{18}$$

And arrange them in order of size: $\lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_p \geq 0$, where each feature root corresponds to a feature vector $U_g (U_g = \{u_{g1}, u_{g2}, u_{gp}\})$. The SPSS software will directly export the eigenvalues and determine the principal components according to the eigenvalues. At the same time, the selected principal components are compared and determined according to the gravel diagram in the SPSS software to ensure the reliability of the selected principal components. According to the method of principal component extraction, remember to select the principal component as: $Y_1, Y_2, \cdots, Y_m$, then:

$$\begin{cases} Y_1 = u_{11}x_1 + u_{12}x_2 + \cdots + u_{1p}x_p, \\ Y_2 = u_{21}x_1 + u_{22}x_2 + \cdots + u_{2p}x_p, \\ \quad\quad\quad \vdots \\ Y_M = u_{m1}x_1 + u_{m2}x_2 + \cdots + u_{mp}x_p. \end{cases} \tag{19}$$

Among them, $Y_1, Y_2, \cdots, Y_m$ is the first principal component, the second principal component, the third principal component...the m-th principal component. The purpose of the principal component analysis is to find the linear combination of $X_1, X_2, \cdots, X_P$, which is used to represent each principal component, obtain the score of the principal component through relevant mathematical calculations, and then weight to obtain the comprehensive score of all principal components as the basis for evaluation. Calculate the score F_i of n samples on m principal components:

$$F_i = u_{1i}X_1 + u_{2i}X_2 + \cdots + u_{pi}X_p \, (i = 1, 2, \ldots, m). \tag{20}$$

The weight of each index can be obtained by weighting the comprehensive index score F.

$$F = \sum_{i=1}^{m} w_i F_i, \qquad (21)$$

$$w_i = a_i = \frac{\lambda_i}{\sum_{m=1}^{p} \lambda_m}. \qquad (22)$$

The evaluation score can be comprehensively determined by combining the index weight and the score of each index.

4. Analysis of Optimization of Management Structure of Construction Enterprises and Coordinated Management of Resources under Urban Environmental Pollution

4.1. The Status of Green Buildings in Construction Enterprises. From 2010 to 2017, the number of green building evaluation and labeling projects in China increased year by year, and only the number of green building evaluation and labeling projects in 2018 was relatively lower than the previous year. As can be seen from Figure 4, the growth rate reached 193.90% in 2011. Although the growth rate decreased from 2011–2015, the number of green building evaluation and identification projects has been increasing, indicating that the country is increasingly concerned about urban green buildings. Therefore, construction companies need to optimize their own business structure and coordinate the management of resources, so that construction companies can follow national policies and develop in the long run, as shown in Figure 4.

The researchers mainly selected more construction majors, followed by energy majors, and fewer other majors. From the perspective of age, the 25–29 age group is the largest, followed by the 30–34 age group, then the 20–24 age group, and finally the 35-year-old and above; the average age of the surveyed green building-related personnel is relatively young, this is because the evaluation work related to green building in China has only developed in recent years. From the perspective of the respondents' cognition and understanding of green building evaluation systems at home and abroad, all the surveyed people have some understanding of ESGB. Among other green building evaluation systems, LEED in the United States has the largest number of people, followed by BREEAM, ESGB, CASBEE, CEHRS, DGNB, GOBAS, HK-BEAM, SBTOOL, EEWH. It can be seen that few people understand some green building evaluation systems in China, as shown in Figure 5.

4.2. Indicator Construction. In order to analyze the management structure optimization and resource coordination management method of construction enterprises under the urban environmental pollution, the index system should be established first, and then the in-depth analysis and research should be carried out. By establishing two-level indicators, the first-level indicators include enterprise mechanism (A), talent quality (B), management performance (C), operation management (D), and resource coordination management (E); the second-level indicators include management system (A1), talent atmosphere (A2), corporate culture (A3), employee quality (B1), employee capability (B2), employee qualification compliance rate (C1), key talent loss rate (C2), product quality qualification rate (C3)), energy conservation management (D1), greening management (D2), waste management (D3), intelligent system management (D4), building main energy conservation (E1), energy system planning and utilization (E2), renewable energy utilization (E3), and the impact of energy consumption on the environment (E4), as shown in Table 1.

4.3. Index Analysis of Management Structure Optimization and Resource Coordination Management Methods of Construction Enterprises. Among the first-level indicators, resource coordination management (E) has the largest weight, with a weight of 0.24, followed by operation management (D), enterprise mechanism (A), talent quality (B), and management performance (C), with a weight of 0.22, 0.2, 0.19, 0.15. As shown in Figure 6, the secondary indicators have the largest weight value of energy system planning and utilization (E2), with a weight of 0.0727, followed by renewable energy utilization (E3), enterprise employee qualification rate (C1), waste management (D3), greening management (D2), energy saving management (D1), main building energy saving (E1), impact of energy consumption on the environment (E4), management system (A1), corporate culture (A3), employee ability (B2), qualified product quality rate (C3), intelligent system management (D4), key talent loss rate (C2), talent atmosphere (A2), and staff quality (B1), as shown in Table 2.

The weight values of the secondary indicators are not much different, and the weight value is about 0.6. Energy system planning and utilization (E2) is the most important, with a weight value of 0.0727, and the least important is employee quality (B1), with a weight value of 0.051, and the difference between the two weight values is 0.0217. Under urban environmental pollution, the optimization of the management structure of construction enterprises and the coordinated management of resources are relatively important, as shown in Figure 6.

In the index, the combined value of CMIN/DF is 4, and the boundary value is less than 5, which judges the fruit to conform to the line; If the fitting value of GFI is 1.1, the fitting value of AGFI is 0.98, and the fitting value of RFI is 0.98 is 0.99, all meet the critical value greater than 0.9, so the judgment result is consistent; the PNFI external fitting value is 0.93, and the critical value is greater than 0.5, so the judgment result is consistent; the RMSEA fitting value is 0.02, and the critical value is less than 0.08, So the judgment result is in line. It shows that the model fitting effect is good, and the model is established, as shown in Table 3.

From Table 4, we can see that the estimated value of the standardized coefficients between the management structure of construction enterprises and the five structural variables is the degree of the direct impact of each index on the management structure of construction enterprises. At the 5%
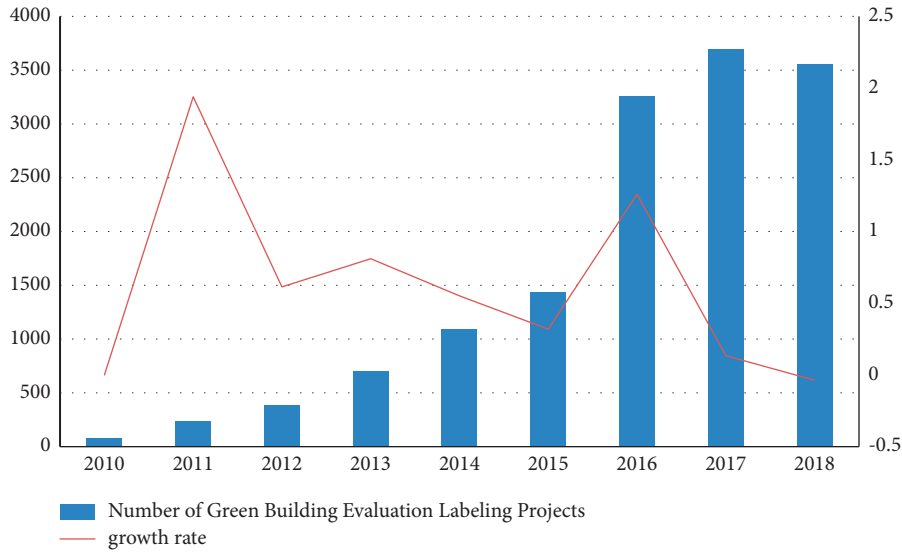
FIGURE 4: Number of green building evaluation and labeling projects.
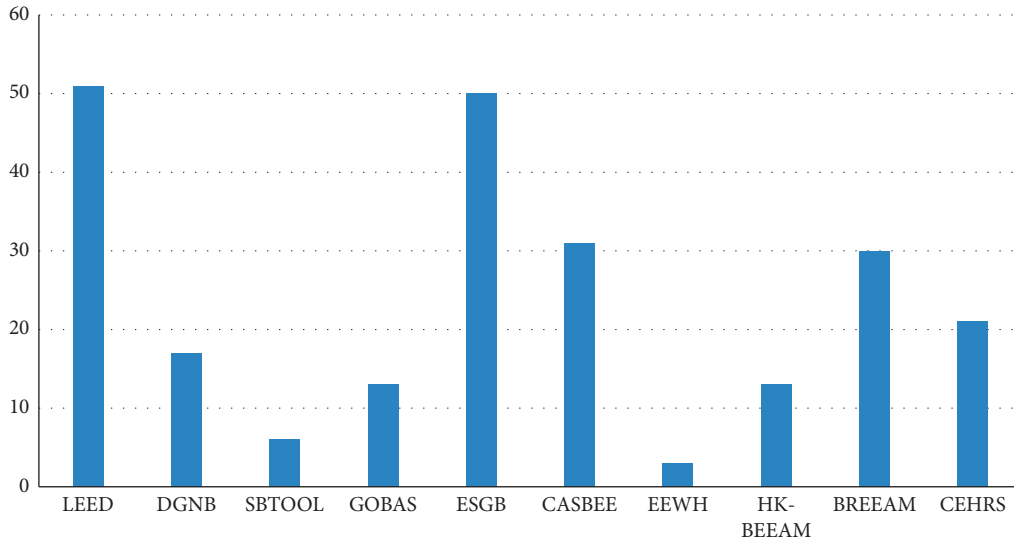
FIGURE 5: Survey people's understanding of green building evaluation systems at home and abroad.

TABLE 1: Indicator system.

First-level indicator	Secondary indicators
Enterprise mechanism (A)	Management system (A1) Talent atmosphere (A2) Corporate culture (A3)
Talent quality (B)	Staff quality (B1) Employee competency (B2)
Management performance (C)	Employee qualification compliance rate (C1) Key brain attrition rate (C2) Product quality pass rate (C3)
Operation management (D)	Energy conservation management (D1) Greening management (D2) Waste management (D3) Intelligent system management (D4)
Resource coordination management (E)	Building main body energy saving (E1) Energy system planning and utilization (E2) Renewable energy utilization (E3) Environmental impact of energy consumption (E4)

FIGURE 6: Secondary indicator weights.

TABLE 2: Indicator weights.

First-level indicator	Weight	Secondary indicators	Weight
Enterprise mechanism (A)	0.2	Management system (A1)	0.063
		Talent atmosphere (A2)	0.056
		Corporate culture (A3)	0.063
Talent quality (B)	0.19	Staff quality (B1)	0.051
		Employee competency (B2)	0.063
Management performance (C)	0.15	Employee qualification compliance rate (C1)	0.066
		Key brain attrition rate (C2)	0.057
		Product quality pass rate (C3)	0.0593
Operation management (D)	0.22	Energy conservation management (D1)	0.064
		Greening management (D2)	0.065
		Waste management (D3)	0.066
		Intelligent system management (D4)	0.059
Resource coordination management (E)	0.24	Building main body energy saving (E1)	0.0635
		Energy system planning and utilization (E2)	0.0727
		Renewable energy utilization (E3)	0.068
		Environmental impact of energy consumption (E4)	0.0635

TABLE 3: Overall model fitting results.

Adaptation indicator	CMIN/DF	GFI	AGFI	RFI	PNFI	RMSEA
Critical value	<5	>0.9	>0.9	>0.9	>0.5	<0.08
Fitted value	4	1.1	0.98	0.99	0.93	0.02
Judgement result	Meets	Meets	Meets	Meets	Meets	Meets

TABLE 4: Summary of the calculation results of the impact parameters of the first-level indicators on the management structure of construction enterprises.

Project path			Standardized estimates	Standard deviation	Critical ratio	P value
Business structure	<--	Enterprise mechanism (A)	0.45	0.09	2.25	0.032
Business structure	<--	Talent quality (B)	0.42	0.07	2.21	0.029
Business structure	<--	Management performance (C)	0.4	0.067	2.32	0.034
Business structure	<--	Operation management (D)	0.46	0.092	2.43	0.03
Business structure	<--	Resource coordination management (E)	0.47	0.094	1.53	0.022

TABLE 5: Summary of the calculation results of the influence parameters of the secondary indicators on the primary indicators.

Project path			Standardized estimates	Standard deviation	Critical ratio	P value
A	<--	A1	0.812	0.03	16.85	0.024
A	<--	A2	0.756	0.05	25.64	0.029
A	<--	A3	0.894	0.034	27.65	0.034
B	<--	B1	0.762	0.029	24.59	0.023
B	<--	B2	0.867	0.016	24.19	0.0136
C	<--	C1	0.866	0.018	19.86	0.0101
C	<--	C2	0.756	0.027	16.73	0.0131
C	<--	C3	0.857	0.057	30.18	0.002
D	<--	D1	0.932	0.017	29.67	0.014
D	<--	D2	0.927	0.18	22.29	0.025
D	<--	D3	0.911	0.019	26.35	0.0291
D	<--	D4	0.901	0.033	29.68	0.0171
E	<--	E1	0.897	0.055	16.28	0.021
E	<--	E2	0.894	0.058	18.44	0.0104
E	<--	E3	0.899	0.034	19.25	0.0341
E	<--	E4	0.898	0.029	20.23	0.024

significant level, the p-values between the enterprise mechanism (A), management performance (C), talent quality (B), operation management (D), resource coordination management (E) and the construction enterprise management structure path are all less than 0.05, these five first-level indicators will affect the operation of construction enterprises. The standardized estimated value of resource coordination management (E) is the largest, which is 0.47, indicating that resource coordination management (E) has the greatest impact on the operation of construction enterprises; followed by operation management (D), enterprise mechanism (A), talent quality (B), management performance (C), the standardized estimates are 0.46, 0.45, 0.42, and 0.4, respectively, indicating that the most important thing for the operation of the cultural industry is the improvement of resource coordination management (E), as shown in Table 4.

In enterprise mechanism (A), the influence coefficients of the management system (A1), talent atmosphere (A2), and corporate culture (A3) are 0.812, 0.756, and 0.894, respectively, indicating that corporate culture (A3) and management system (A1) are relatively important reasons that affect industrial resources. In talent quality (B), the coefficients of employee quality (B1) and employee ability (B2) are 0.762 and 0.867, respectively, indicating that employee ability (B2) has the greatest impact on it, and the enterprise attention should be paid to the introduction of talents to improve the comprehensive ability of employees. In the management performance (C), the influence coefficients of the employee qualification rate (C1), the key talent

loss rate (C2), and the product quality qualification rate (C3) are respectively, 0.866, 0.756, 0.857, indicating that the employee qualification rate (C1) is more important to management performance (C), so construction companies should train employees to improve the employee qualification rate, and at the same time control product quality. In (D), the influence coefficients of energy saving management (D1), greening management (D2), waste management (D3), and intelligent system management (D4) are 0.932, 0.927, 0.911, and 0.901, respectively. The impact of green building is relatively large, indicating that construction companies should improve and optimize green buildings, closely follow national policies, and develop in the long run. In resource coordination management (E), building main body energy conservation (E1), energy system planning and utilization (E2), the utilization of renewable energy (E3), and the impact of energy consumption on the environment (E4) are 0.897, 0.894, 0.899, and 0.898, respectively, indicating that the utilization of renewable energy (E3) has the greatest impact on it, and the main building energy conservation (E1)), energy system planning and utilization (E2), and the impact of energy consumption on the environment (E4) also have a relatively large impact on resource coordination management (E). Recyclability is still a concept of a continuous process, as shown in Table 5.

It can be seen from Table 5 that in terms of enterprise mechanism (A), corporate culture (A3), and management system (A1) are relatively important factors affecting industrial resources; in terms of talent quality (B), employee ability (B2) has the greatest impact on it and enterprises
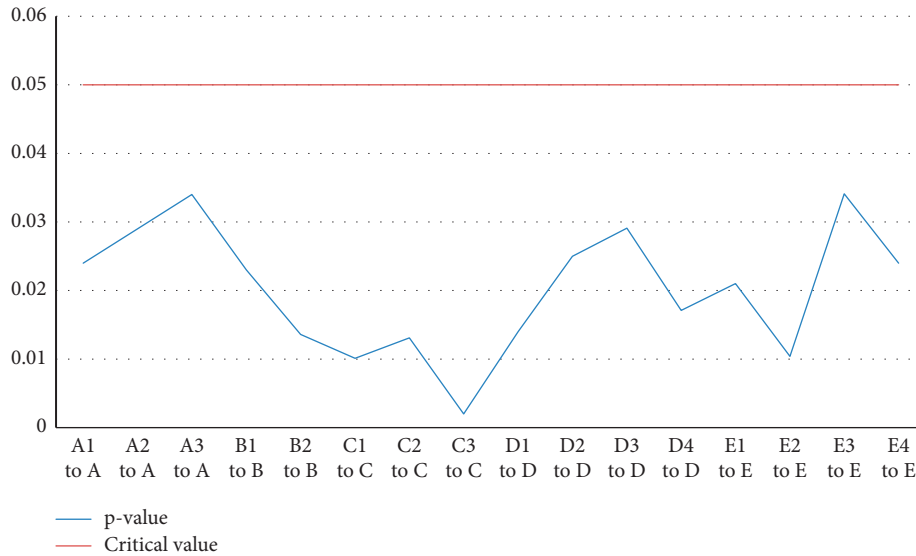
Figure 7: Comparison of P values and critical values.

should pay attention to the introduction of talents and improve the comprehensive ability of employees; in terms of management performance (C), construction enterprises should train employees, improve the qualification rate of employees, and also control product quality; in operation management (D)), construction enterprises should improve and optimize green buildings, follow national policies, and develop in the long run; in terms of resource coordination management (E), construction enterprises should continue to deepen the concept of green buildings, and also strengthen the recycling of green building materials and equipment. Recycling is still a continuous concept.

From Figure 7, we can see whether the degree of direct influence of the estimated value of the standardized coefficient between the first-level index and the second-level index is significant. At the 5% significant level, the P values between the paths of the secondary indicators and the primary indicators are all less than 0.05, indicating that the path of structural variables and each indicator variable has a significant impact.

5. Conclusions

Construction enterprises should establish sound organizational structures and green construction management systems and systems. To improve employees' awareness of green building management and strengthen the management of professional responsibilities of managers, the purpose of managing green building organizations is to establish a green building management system. Managers should have a clear division of labor, standardize the positions of greenfield managers and supervisors, and effectively guarantee and promote the implementation of green projects. Provide regular training and material incentives to encourage employees to deepen their understanding of green building or select outstanding employees to learn green building professional knowledge to improve their

overall quality. Vigorously develop technologies related to green construction technology in construction technical standards, and formulate corresponding implementation measures. The classification and recycling of construction waste is an optimized plan for material saving measures, and the green construction of construction projects should focus on five aspects: environmental protection, water resource protection and water resource utilization, material resource protection and utilization, energy saving and energy utilization, and land protection and land resource protection and each aspect should be evaluated. In order to prevent ineffective project supervision, corresponding measures have been formulated to strengthen the supervision of each link.

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work.

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Retraction

Retracted: Analysis of the Implementation Effect of College Curriculum Ideological and Political under the Background of Ecological Sustainable Development

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] X. Wu, D. Wu, and X. Ma, "Analysis of the Implementation Effect of College Curriculum Ideological and Political under the Background of Ecological Sustainable Development," *Journal of Environmental and Public Health*, vol. 2022, Article ID 3937168, 11 pages, 2022.

Hindawi

Research Article

Analysis of the Implementation Effect of College Curriculum Ideological and Political under the Background of Ecological Sustainable Development

Xiaoli Wu [1], **Dang Wu,**[2] **and Xiufeng Ma**[3]

[1]*School of Marxism, Handan University, Handan 056000, China*
[2]*School of Special Education, Handan University, Handan 056000, China*
[3]*School of Economics and Management, Handan University, Handan 056000, China*

Correspondence should be addressed to Xiaoli Wu; 5418@zut.edu.cn

Our country is paying more and more attention to ecological issues. How to put ecological sustainable development in real life is a key problem. This article discusses the significance of integrating ecological sustainable development and college ideological political courses. Therefore, an experiment was designed to analyse the model of ecology and other courses. The final experiment showed the following: (1) The ecological sustainable development model can be well integrated into the students in their courses. Students can freely choose to study some quality assurance thought courses and reinforce their spiritual level. The mentality of this model can also self-optimize to solve students' troubles in choosing courses and consider the level of students intimately. (2) According to the experimental data of the figures and tables, it is concluded that the form "other professional courses" at my country is still very serious, and the popularization of ideological and political courses is not common, so it is a little troublesome to carry out work, but our system model is very characteristic. With its help, we have obtained the effect of the integration of ecological sustainable development and students' curriculum. The state has vigorously provided economic support for their development. Under their influence, students have gradually maintained their awareness of protecting the environment. Socioeconomic and environmental conditions are also improving. However, in the future, the times will change, and we will continue to update the system model to adapt to more challenges.

1. Introduction

Ecological environment describes the role of IS in ecological sustainable development and raises three issues of ecological efficiency, ecological fairness, and ecological benefit. We put many things of ecological sustainable development into this system to achieve more approach to environmental ecology, underscoring the importance of practitioners in understanding the environmental impacts of IS development or use, and the role IS plays in promoting large-scale research on environmental sustainability [1]. This paper describes the impact of the soil ecological environment of Kembela Village, West Kalimantan, Indonesia, and investigates the content of microcomponents, such as pH and phosphorus molecules, in the cultivated soil from decades ago to present,

and infers that the ecological environment of the land after cremation is better. This development model is sustainable development [2]. A potential reconciliation theory for exploring environmental sustainability and individual well-being is mentioned in Ecological Sustainability, and analysis of related theoretical and empirical evidence suggests that environmental degradation makes it difficult to meet the needs for security, capacity, connectivity, and autonomy; there is now a need for sustainable development that meets these four needs to improve the situation. These include shifting values from external, materialistic goals to internal goals to help people choose a more ecologically sustainable way of life [3]. It describes the issues of sustainable development and environmental protection discussed by the United Nations. The sustainable development of the Arab

world is facing major dangers. The living environment of human beings is developing in positive and negative directions. According to the current data, in order to discuss the most important demographics and sustain the development path of the Arab countries, we propose partial ecological integration based on exchange of vegetables, items, and coolies, which is the greatest hope for improving Arab restoration and sustainable development [4]. Sustainable development has always been center information for ecological protection and state regulations, but that understanding landscape and sustainability issues leaves much to be desired. The spatial land use uninterrupted index project aims to improve spatially unique metrics for mapping environmental uninterrupted. Environmental sustainability is defined in terms of uncertainty and environmental complexity and is used to assess environmental sustainability, which can show similar results despite differences in these methods. Landscape structure indicators have been the reason why they are the standard by which a good ecological environment can develop uninterruptedly; that is, they are connected with the ecological environment features of the landscape [5]. Over time, the environment needs to be addressed through the spatial scales associated with higher land use, from a single farmer's farm to the rest of the world. In addition to the production efficiency and sustainability of agroecosystems, as an important factor in sustainable development, the speed with which production patterns recover from deterioration. Consider temporal and spatial projections of processes affecting sustainability, in particular the movement of energy, wind, water, and nutrients, as well as climate change and natural disasters [6]. Ideological teaching to students is the fundamental requirement of education, which not only includes unique Chinese traditional thinking, but also includes the reform of educational concepts in the rapidly changing new era. It is very common and has gained some applied educational methods at colleges and universities, but in some areas, there is still room for improvement. It is an important part of classroom teaching for college teachers to implement good ideas. Therefore, college teachers should do everything possible to deepen the connotation and meaning of thoughts, understand the specific issues of ideology and politics, focus on development of courses and the main methods of classrooms, and apply practical theories and courses [7]. "Course Ideology and Politics" is a new educational concept that combines personal ideological teaching with politics. With the development of our country, the application of foreign language skills is in very high demand. As a course that combines cross-cultural knowledge with the purity of foreign cultural systems, college English courses must meet the great demand of college students for ideological and political ideas that change the content and methods of teaching. Change college English teaching, go beyond traditional English teaching, deepen the transformation of translation teaching, and cultivate intercultural communication skills and modern applications of higher academic education forecasting [8]. Ideological and political learning can be explained in other ways. Based on this problem, we revise the curriculum and improve the teaching plan, teaching methods, and assessment methods in the curriculum. Throughout the course, we hope to enhance students' patriotism, stimulate their innovative thinking and entrepreneurial spirit, and ultimately cultivate a balanced attitude towards life, worldview, and values. Finally, make some contributions psychological education reform of college courses [9]. College curriculum ideology and politics is a creative conception to realize the core mission of Rieter to cultivate people. The same intellectual and political resources form a valuable coalition of leaders in the process of knowledge transfer and skill development, helping students affirm their values and beliefs, and foster patriotism and personal education. Therefore, teachers should not only provide technical skills, but also start from the basis of "education," emphasize the ideological and political issues of character teaching, and attach importance to the value management of organic relationships. The application of ideology and politics in the study of construction drawings in colleges is discussed, and then the steps for incorporating ideological and political elements into learning materials to provide teaching guidance are highlighted [10]. With the steady upward of network technology today, the courses of online colleges and universities are becoming more and more popular. In fact, the platform a network of them and services provided by social networks. Given the enormous value of the Internet in community and community education, we need to fully recognize the new opportunities and challenges brought about by the rapid development of the Internet in traditional and community education and make existing systems useable. Ideological education community education, political science ideology, and political network: how to use online services effectively in academic; how to work effectively in social networks through academic and political education; how to strengthen teaching system; and how do websites understand politics and policy? These are important questions that our current research at the university should answer [11]. Environmental values in ideological and political education are gradually emerging to better solve environmental and environmental problems. On the one hand, we need to understand what it means, and on the other hand, we must consider the principles outlined in Marx's book of the environment. It is also important to discuss and assess environmental values in relation to ideas and policies that threaten society in different ways [12]. The current university teaching concept is based on the "online and offline" teaching system. In my country's education system, ideology and politics are closely related to educational goals. The contemporary teaching concept is mainly to combine ideological and political courses with daily learning, that is, on the basis of "online and offline integration." This time, a university English language course is used to discuss the relationship between blended learning and ideological and political learning, to explore blended teaching methods, and to make suggestions on how to restructure the assessment system to provide information [13]. With the rapid development of my country's education field, the integration of network technology and schools is bound to evolutionary trend. In the context of the Internet, they are also in full swing. In the process of development, we should

improve and innovate, analyze the new development path of the Internet, and improve the quality of the new school reform through innovative development. It is necessary to pay attention to continuity of excellent previous ecological concept and to realizing the biological connection between the Internet and ideology and politics [14]. Curriculum-based ideology is at the center of educational research and reform. According to the initial literature collection of the knowledge database, the use of time allocation, survey sources, research authors, and so on to analyse keywords, and so on, it is found that there are still many problems in ideology and politics, and we still need continuous efforts to change this phenomenon [15].

2. Ecological Sustainable Development Analysis

2.1. Definition of Ecological Sustainability. Ecologically sustainable development is development that responds to contemporary needs without compromising the latter; it should have the ability to apply this phenomenon to its own needs. They form a together provision that requires not only the purpose of socioeconomic growth, but also the protection of many ecological environments they use (e.g., freshwater, ocean, etc.). The focus of sustainable development is economic and social development, strong social governance, and the improvement of human quality; always developing utilization of resources is a necessary condition for the sustainable development of the world. People are the focus of sustainable development. Sustainability is real progress.

2.2. Principles of Ecological Sustainability. Fairness principle: Intergenerational equality, resource allocation, and use equality. Ecological sustainable development is an opportunity and an advantage. It also strikes the balance between generations and regions, in other words, to be able to guarantee the current requirements without disturbing future. The principle of generational productivity proves that all generations live in a and have the same right to life. To this end, ecological sustainable development makes poverty eradication. There is a major problem that needs to be solved in all countries and regions. Sustainability principle: In other words, there must be constraints to meet demand; the concept of development contains constraints; the word "evolution" also contains constraints. Therefore, environment, resources, and social engineering and organizational conditions limit the environment's ability to meet current needs. The most serious condition is the infrastructure it depends on: natural objects and ecological protection. It can be seen that sustainable performance links the real interests of people with the real interests of the people. The principle of universality: Although ecological models in different countries will be different, it is common to develop the principles of equality. The integrity and connectedness of the planet dictates that the planet must come together to recognize our home. Ecological sustainability analyzes international issues through cultural and historical barriers. The problems addressed there involve everyone, that is internal

affairs and foreign affairs, and the common goal of sustainable development can only be achieved through the joint efforts of all parties and the combination of people's individual interests and common interests.

2.3. The Basic Connotation of Ecological Sustainable Development. In 2002, my country took the uninterrupted development of the ecological environment as the main goal, which can ensure economic growth and change people's current way of life, which will gradually become a new society, ethics and civilization, and its basic connotations are as follows: Pay attention to development issues. Growth is different from economic upturn, growth is a combination of social, technological, cultural, and many other phenomena. The sustainable development of the people, economic and social development shall not exceed the bearing capacity of natural; Fair exchanges between people, everyone today should strive to ensure that future generations develop and take advantage of the same development opportunities, and the development of a generation is the development of the few, not affecting the interests of others. The continuous coexistence of man and nature requires people to establish new values and limit; we must know how to care for nature, learn more about nature, and make progress together with nature. The sustainability of social development and economic development is the basic requirement of development. Make overall plans and take the road of civilization. The final decision, which is conducive to sustainable development, is an important historical milestone in the development of human civilization.

2.4. The Significance of Ecological Sustainability. At the beginning of the twenty-first century, the main goal of my country's sustainable development was to continuously improve the potential of sustainable development, achieve excellent results in economic restructuring, effectively control the entire population, and "significantly improve environmental conditions and increase resource utilization." "It promotes the harmony between man and nature". It helps the whole society to realize civilized production. The form of development includes the development of production, the prosperity of life and the good ecology. By adjusting the strategic structure of the national economy, we can optimize and upgrade the industrial structure, release resources and environment, change the balance of regional development, and narrow the gap between urban and rural areas.. Efforts are made to promote hunger eradication and poverty alleviation, continuously improve regional production and living conditions, strengthen infrastructure construction, improve the environment, and gradually transform the economic households that have not been lifted out of poverty to live a better life. Here are a few key points: Implement sustainable development policies to promote the combination of environmental benefits, economic benefits and social benefits. Promote the harmonious development of the economy, people, resources, and the environment, which is conducive to the transition of the economy from strong growth to strong growth, promotes sustainable, stable, and

healthy economic development, and improves people's living conditions and quality of life. The development at the present stage is from the development of urgent and semi-interests to long-term interests and common interests, from the development of material resources to intangible resources or information resources (technology and knowledge).

3. Research on Ideological and Political Education in Colleges and Universities under Ecological Sustainable Development

The analysis implementation effect course under the background of ecological sustainable development adopts the simulated ecological sustainable development model, constraints, and student course recommendation models. This model has a complete system, which can completely integrate a student's points of interest. The hobby of ideological and political courses is displayed, even if there is a little error, it is normal. After all, there are too many factors to be considered in the system. As long as the students make a little change, the results of the system will deviate; as long as the data is correct, then the final result has a high probability to meet the psychological expectations of the students, and the system also has a personal optimization function, which can be used to strengthen the results of the second calculation.

3.1. Establishment of an Optimal Configuration Model for Ecological Sustainable Development.

Modelling methods can evaluate the evolution of the system against various design recommendations, and optimization methods are used to control the behavior of the system and develop strategies to understand the combination of modelling and optimization. The overall goal of system development is expressed through maximum overall benefit, generally in the following form:

$$Z = \max[F(X)] = \max\{S(X), J(X), H(X)\}, G(X) \leq 0. \quad (1)$$

The whole formula expresses the overall benefit in ecological sustainable development. $S(X)$, $J(X)$, and $H(X)$, respectively, express the goals of social, economic, and environmental benefits. Analyzing the maximum interests, they can be regarded as the overall interests of the ecologically sustainable model. All of these three points will be studied later. $G(X)$ is a limiting condition, which is to ensure that the system model can be well necessary constraint for its operation to continue, where X is the vector of solutions. $F(X)$ is the total benefit function. $S(X)$, $J(X)$, and $H(X)$ are the goals of social, economic, and environmental benefits, $G(X)$ is a set of constraints, showing the ability of ecological environment resources, the ability to resist the environment, and the ability to carry land resources capacity and regional sublocal capacity.

3.1.1. Social Benefit.

Social benefit is something that cannot be seen or touched, so it is not easy for us to make statistics and display it. We can transform the social benefit of ecological sustainable development into a specific thing, such as using water resources to measure social benefits. development, which can be a good reflection of the link between society and ecology:

$$\max S(X) = -\min\left[M_J^K - \sum_{c=1}^{L} X_{cj}^k\right]. \quad (2)$$

Among them, these letters express the water consumption of the people in the K area and the total water storage capacity of the water source they use, and the following symbols almost all mean this.

3.1.2. Economic benefits.

Indirect economic benefits are brought about by the water supply of a region's ecological environment:

$$\max J(X) = \max\left[\sum_{i=1}^{I(k)} \left(b_{ij}^k - c_{ij}^k\right) + \sum_{C=1}^{L} \left(b_{cj}^k - c_{cj}^k\right)\right]. \quad (3)$$

Formula (3) represents the economic benefits of water resources for the sustainable development of the ecological environment, which includes the economic coefficient of water resources and the clearly marked price of water resources provided. The proportion of the total reservoir and the cost of water consumption by each household can be optimized in the later stage. It ignores a function of saving water, and it should add a limit of forced water cutoff to avoid excessive water consumption and the depletion of the reservoir.

In, b_{ij}^k, b_{cj}^k are the economic coefficient of water resources provided by two water source areas to j user units in k area, c_{ij}^k, c_{cj}^k. It is the cost of two water source regions to provide water resources to j user units in the k region. By enumerating these and calculating their maximum consumption and maximum water cost, the economic benefits of these two ecological environment regions can be simply obtained.

3.1.3. Ecological environmental benefits.

The ecological environment generally includes water resources and land resources, and we will not discuss other bioclimatic resources. All the formulas listed are as follows:

$$\max H(X) = -\min\left[\sum_{k=1}^{k} \left(\sum_{i=1}^{I(K)} X_{ij}^k + \sum_{c=1}^{L} X_{cj}^k\right)\right]. \quad (4)$$

X_{ij}^k indicates that area k meets the specific water demand of place i during a period of time; X_{cj}^k means that the land resources in the k area meet the utilized land resources in the j area, and the two are combined to obtain the group maximum negative output value of the ecological environment.

3.2. Restrictions.

Restrictions on water supply capacity of water resources and ecological environment are expressed as follows:

$$\left.\begin{array}{c}\displaystyle\sum_{j=1}^{J(K)} X_{cj}^k \le M_c^k \\[2ex] \displaystyle\sum_{k=1}^{k} M_c^k \le N_c \end{array}\right\}. \tag{5}$$

Formula (5) has two meanings. The first is that the independent water source should be lower than the public water source, and the public water source should be smaller than the world's water reserves. This kind of restriction is realistic and can ensure the perfect operation of the system.

Water Supply System Capacity Limitation.

Public water source:

$$X_{cj}^k \le Q_C. \tag{6}$$

Independent water source:

$$X_{ij}^k \le Q_i^k. \tag{7}$$

Q_C is the maximum water supply capacity provided by the water source C that we can all use; Q_i^k is the subregion of the k region with the largest water supply capacity.

The upper and lower limits of the water users need

$$M_{JL}^K \le \sum_{i=1}^{I(k)} X_{ij}^k + \sum_{c=1}^{L} X_{cj}^k \le M_{jH}^k. \tag{8}$$

(4) Urban water discharge limit.

Minimum water discharge:

$$Z_{kg}^t \le Z_0^t. \tag{9}$$

Total limit:

$$\left[\sum_{k=1}^{K}\sum_{j=1}^{J(k)} 0.01 d_j^k p_j^k \left(\sum_{i=1}^{I(k)} X_{ij}^k + \sum_{c=1}^{L} X_{cj}^k\right)\right] \le N_0. \tag{10}$$

In, d_j^k is the concentration of pollutants emitted by all users in the k area; p_j^k is the discharge amount stipulated in my country; it is the total amount of pollutants allowed.

Ecological environment constraints:

$$\sum_{k=1}^{K}\sum_{z=1}^{Z} X_z^k \le S^k. \tag{11}$$

Regional common development restrictions:

$$u = \sqrt{u_{A1}(\sigma_1) u_{A2}(\sigma_2)} \ge \overset{*}{u}, \tag{12}$$

u is the actual adjustment; $\overset{*}{u}$ is the best adjustment; A_1, $A2$ is an unclear subset of the connection between water use and regional economic development, and it is an unclear subset of the connection between local economic development and water environment quality improvement.

Nonnegative limit:

$$X_{ij}^k \cdot X_{cj}^k \ge 0. \tag{13}$$

3.3. School Extracurricular Curriculum Proposal Model under Ecologically Sustainable Development. Traditional aggregation algorithms identify options by restricting connectivity and use attributes of existing useful fields to jointly predict and generate suggested assets. A complete process can bring the best results for your insurance. Due to the lack of some algorithms, the popular custom filter screen shows up in the early stages. When the following useful points are achieved for target users, strong data deletion cannot find strong data, resulting in poor real-time performance of the algorithm. When data shortages peak, new users can experience cold start issues, overloading the system. As long as the recipients of higher education and university science and policy are identified and aligned to some extent, screens of collaborative work are used to build high school concepts and models and encourage university policy recommendations.

3.3.1. Collect Data to Establish Similarity Calculation. To avoid lack of raw data, a course that students liked in their minds in a variety of ways was found and classified according to different preferences, such as preliminary cold data collection; current noise and user errors, and data processing algorithms are used to filter out data noise. To limit the database to (0, 1), the database must be normalized. A common practice is to separate the different data with the highest value in that category. Vector methods are used to quantify similarity. According to the Euclidean–Read distance formula, if X and Y are two points in a multidimensional world, then the distance formulas of these two points are expressed as follows:

$$d(x, y) = \sqrt{\left(\sum (x_i - y_i)\right)^2}, \tag{14}$$

$$V_{km} = C_{km} + a_m^T X_k. \tag{15}$$

Among them, when $n = 1$, the calculated result is the distance between these two points. When $K = 2$, it represents the time required to walk the middle distance, but they are not perfect, we need to improve them:

$$\text{sim}(x, y) = \frac{1}{1} + d(x, y), \tag{16}$$

$$\text{VIF}_K = \frac{1}{1 - X_{X_k}^2}. \tag{17}$$

Formula (16) represents the degree of liking of a course. It is reflected in the formula by the length of the distance. Formula (17) represents the time required to like this ideological and political course. With the addition of this formula, we can better observe the attitude changes of college students in the system and adjust the development in a timely manner and classify the students through the results obtained so as to better serve them and pick a course they like.

x and y indicate the degree of students' liking for a certain ideological and political course, and K still indicates the time it takes for them to complete the course.

3.3.2. Minimum Similarity Calculation of Neighbors. It limits the maximum value of students' political and ideological neighbors, and the distance to K is the neighborhood of the current point. Some students are adjacent to ideological and political courses, but there will not be much confusion and deviation in the selection of quantity; especially in personal matters, the advantages are obvious and the ability of students is improved. Neighborhood calculation in ideological and political direction:

$$F(z) = \exp\left[-\exp(-z)\right], \tag{18}$$

$$p_k(m) = \sum_{q=1}^{Q} p_k(q) \times p_{klq}(m). \tag{19}$$

3.3.3. Calculation Recommendation. Based on the information of nearby students and nearby, a calculation recommendation mechanism is established, which aims at philosophers and political courses by taking "All students love political ideological course" as a vector. Following similar courses in the political ideal course, current students are predicted to show no interest based on the historical interest of the target students, and the consecutive, sequential order of the political ideal course is calculated in the form of a list of recommendations and predictions:

$$\text{CAIC} = -\ln L(a) + c \times (1 + \ln K), \tag{20}$$

$$\text{BIC} = -\ln L(a) + c \times \ln K. \tag{21}$$

Not all students know what ideological and political courses they like, so we need to create formulas (20) and (21) for recommending ideological and political courses to help them choose courses. A and k are two ideological and political courses. For the overall database, if there are new ideological and political courses in the future, they will also be placed in these two. The calculation recommendation system is recommended for students in these two. If there is nothing they want at present, then when they like it, a similar course in the political ideals course is distributed to students based on the historical interests of the target students.

a and k are the overall databases of two courses; students choose favorite ideological courses among them; through these two formulas, relevant content for their chosen course is obtained.

3.4. Optimization of Recommendation Model for Higher School Thought Courses. In view of the shortcomings of traditional collaborative filtering algorithms, the real-time recommendation model for ideological and political courses in colleges and universities is expanded, and the scope of application of the recommendation model for ideological and political courses in colleges and universities is expanded. It will become an advanced collaborative filtering algorithm for ideological and political courses in colleges and universities. Aiming at the actual needs of the in political and legal universities, an improved algorithm based on association grouping

filtering is applied. By introducing a progressive curve based on user speed, the traditional grouping filtering algorithm has problems, such as low efficiency, poor adaptability, and exclusion.

3.4.1. Introduce the Student History Hobby Mechanism. To overcome the problem of cold start of freshmen due to lack of reference materials, the historical association method is adopted to classify and link the historical interests of all students. A series of analogies are drawn with the combination of historical desires and similarities between ideology and political direction are calculated.

$$\text{sim}(i, j) = \frac{\sum_{u \in U}(R_{ui} - \overline{R}_i)(R_{uj} - \overline{R}_j)}{\sqrt{\sum_{u \in U}(R_{ui} - \overline{R}_i)^2}\sqrt{\sum_{u \in U}(R_{uj} - \overline{R}_j)^2}}. \tag{22}$$

U is all students, R_{ui} and R_{uj}, respectively, represent the data of students' historical interest in ideological and political courses, and $\overline{R}_i$ and $\overline{R}_j$ represent the students' average score evaluation of the course after taking the course.

3.4.2. Introduce the Student's Forgetting Curve. Considering the changes of students' grade information over time, the historical fusion probability theorem is extended into a robust database that can continuously adapt to the rapid changes in students' real needs. It provides interest points for students in the new era and provides more concise, up-to-date, and personalized recommendations.. Due to the rapid dissemination of information about students' "level of interest," students' choice of information results in a strong correlation between recommendation effectiveness and timing. By realizing the forgetting curve $R = e - t$ and the comprehensive damping coefficient $s(u, v, i)$ according to the actual situation of the student's area of interest and the optimization formula (22), the recommendation according to the recommendation time effect is synthesized, using the following formula:

$$s(u, v, i) = e^{-a}\frac{|t_{ui} - t_{vi}|}{t\max^{-t}t\min}. \tag{23}$$

Formula (22) represents the student's history hobby formula, and formula (23) represents the student's forgetting formula. Both of these formulas are optimized for the recommendation model of college ideological and political courses and are both to better serve students. *Sustainable Development Ideological and Political Course.* With this student history, we can provide more thoughtful services to each student and also allow students who have attended the class to leave their opinions so that we can reform; introducing the forgetting curve can help us know the best of students. Memory points are sufficient, and students'course time can be arranged reasonably.

In the appeal formula, t_{ui} and t_{vi} are the time required for student u, v to develop hobbies for an ideological and political course, $|t_{ui} - t_{vi}|$ is the hobby time gap between them, t max is the maximum time limit for students to generate hobbies, and t minrepresents the minimum time for

students to generate hobbies. Equation (23) can be optimized to be more advanced:

$$sim(u,v) = \frac{\sum_{i \in l_{uv}} \left(R_{ui} - \bar{R}_i \right) \left(R_{uj} - \bar{R}_j \right) s(u,v,i)}{\sqrt{\sum_{i \in l_{uv}} \left(R_{ui} - \bar{R}_i \right)^2} \sqrt{\sum_{i \in l_{uv}} \left(R_{uj} - \bar{R}_j \right)^2}}. \quad (24)$$

In the formula for calculating the similarity of student u, v political and ideological education choices, the decay factor in the forgetting curve is constrained by the student's hobby time and loss coefficient, indicating that the greater the time difference between student u, v, the more similar the students are. The performance will be reduced due to the reduction of the attenuation factor.

4. Experiment Analysis of Ecological Sustainable Development Integrated into College Curriculum Ideological and Political

4.1. The Necessity of Introducing Ecological Sustainable Development into College Curriculum. In a technical sense, "ecology" literally means "the violent evolutionary interaction between living things and organisms and between organisms and their natural environment." Its essence is a strong and continuous connection between interconnected parts. Therefore, from an ecological point of view, we can also understand the harmonious interaction between organisms and the environment. The ecological system emphasizes the harmony and unity of organisms and the environment and the unity and balance of the system. It should be linked to the ideological and political education system in colleges and universities and requires unity and balance. Ideological and political education in colleges and universities reflects the relationship between teachers and students and their educational environment and reflects the core of "ecology." Therefore, it is entirely possible to give full play to the professional benefits of high schools and to integrate the concept of ecological sustainable development into the ideological and political education of high schools and universities. Of course, this requires the strong support of my country. At present, the country with the best ecological sustainable development in the world is Japan. After it is proposed to integrate ecological sustainable development into the ideology and politics of college courses, my country's economic expenditure and Japan's economic expenditure are gradually decreasing.

The investment in ecological sustainable development in my country and Japan is constantly increasing. My country has increased from 1.1 to 620 million yuan at the beginning, and Japan has increased from 5.4 to 690 million yuan. At the same time, my country's growth rate is significantly higher than that of Japan, the best ecological sustainable development country, but I believe that since our country has begun to pay attention to this issue, our country will surpass Japan to become the first in the near future.

According to the data in Figure 1 above, it can be seen that my country's ecologically sustainable economy is increasing rapidly every year, and the annual increase rate is
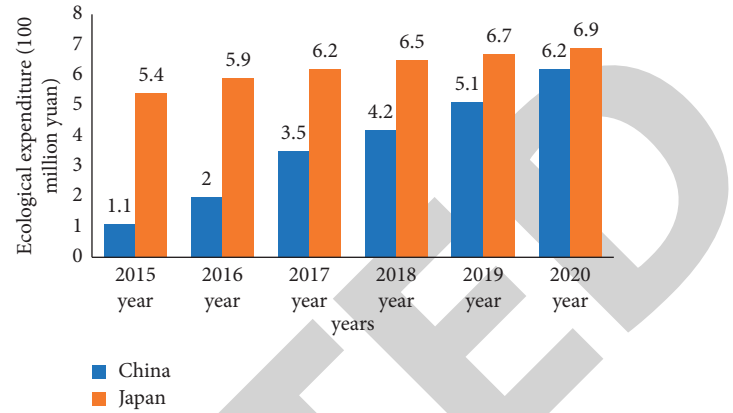
Figure 1: Comparison of economic spending between China and Japan.
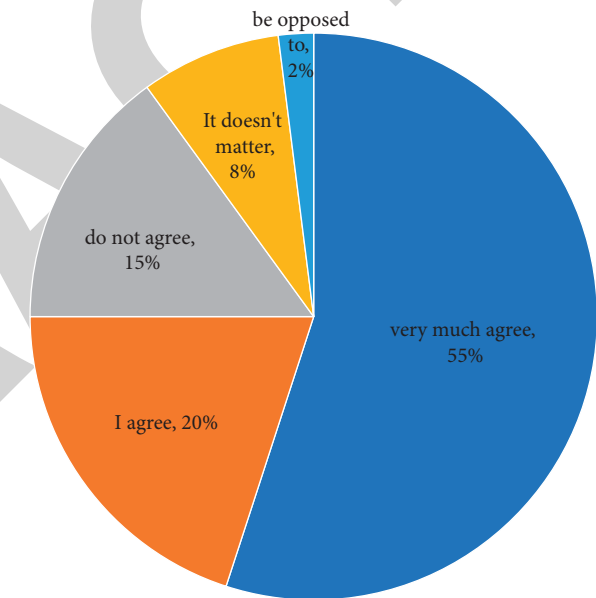
Figure 2: Survey of students.

faster than that of Japan, which is enough to prove my country's determination to change the ecological environment and sustainable economic development. It is believed that in the near future, my country will surpass Japan to become the first environmental protection country. Then, we selected some colleges and universities to investigate the attitudes of students. Through Figure 2, we got most of the students' support for this reform. After all, they are students in the new era, and most of them want to do meaningful thinking. They are also deeply aware of ecological protection awareness and sustainability.

With the rapid development of the world's industry and the development and use of more energy, the problem of environmental pollution has become increasingly serious and diversified. People have gradually realized the threat and damage caused by environmental pollution to human beings and the natural environment, their awareness of

Table 1: Teaching content.

Learning content	Solution	Teaching percentage
Water pollution problem	Strictly control urban sewage discharge	25%
Air pollution problem	Particulate pollutant purification technology	25%
Solid waste disposal issues	More recycling	15%
Noise and radioactive pollution issues	Take strict protective measures	20%
Comprehensive prevention of pollution	Reasonable planning and layout of resources	15%

Table 2: Ideological and political analysis.

Ideological and political analysis	Content	Proportion
The essence of ideological and political courses	Realizing ideological and political collaborative education with curriculum as the carrier	25.20%
Characteristics of ideological and political courses	Extensiveness, occultity, and diversity	30.20%
Difficulties of ideological and political courses	The integration of ideology and politics and students and the contradiction of the system	15.00%
Ideological and political course innovation	Using the Internet as a technology to strengthen ecological sustainable development	34%

environmental protection has been continuously enhanced, and they have realized the necessity and importance of ecological protection. The emergence and deepening of this awareness has further promoted the integration of ecological sustainable development into the development of ideological and political projects in college curricula. Among them, we focus on educating students on the current serious ecological and environmental problems, hoping that they can find better solutions in the future, as shown in Table 1.

4.2. Ideological and Political Content of College Courses. Ideological and political courses refer to the system in which schools use all ideological and political courses to carry out ideological and political education. There are several reasons for understanding and adopting this concept: First, ideological and political education is not a single course, but a system that includes the goals, content, methods, and methods of ideological and political education. Second, the "courses" referred to in ideology and politics refer to all ideological and political courses, including general courses, basic courses, specialized courses, and even secret courses without special learning forms. *Ideological and Political Course.* Therefore, the course is not part of the ideological and political course. Third, the field of ideological and political science teaching is ideological and political education, which is an important starting point for the practice of "three-dimensional education." Fourth, ideology and procedure remain important concepts. As a new ideological and political concept, it is very important to promote the reform of ideological and political education; as an important concept of the curriculum, it gives the curriculum reform a broad position. It is shown in Table 2.

Systematically and effectively organizes its members to have specific ideology, political attitudes, and moral standards to shape their ideological and moral qualities. The main teachings include ecological sustainable development,

college students' mental health, modern Chinese, mechanical design, and computer systems. We then applied predictive analytics to these to more quickly adapt to future changes, as shown in Figure 3.

Among them, we can see that these are growing every year, and they have not stopped until 2016, which indirectly shows the importance of ideological and political education. But so many ideological and political courses will indirectly affect our own professional courses, and so on.

Figure 4 shows the student absorption rate after the course changes before and after the integration of ecological sustainable development and college ideological and political courses. Joining ideological and political courses has both advantages and disadvantages, such as ecological sustainable development and college students' mental health in the help of ideological and political courses In the next year, students like to listen to lectures more and more, and they absorb it better. On the contrary, their professional courses and advanced mathematics have declined.

4.3. The Situation after the Integration of Ecological Sustainable Development and Ideological and Political Courses in Colleges and Universities. After the integration of the two, the ecological environment in our country has been significantly reduced. By constantly giving students courses on ecological sustainable development, it subtly affects their thoughts and causes their actions to change. To drive the people around them, after a period of time, we investigated some data to analyse their teaching mode and ecological environment, as shown in Table 3 and Table 4.

It is necessary to carry out this reform through investigation and analysis. Through the data, it can be clearly found that the ecological environment has become better, and the living environment of the students has become better and better. After introducing a system that combines historical priorities and a rate-of-change-based system, we
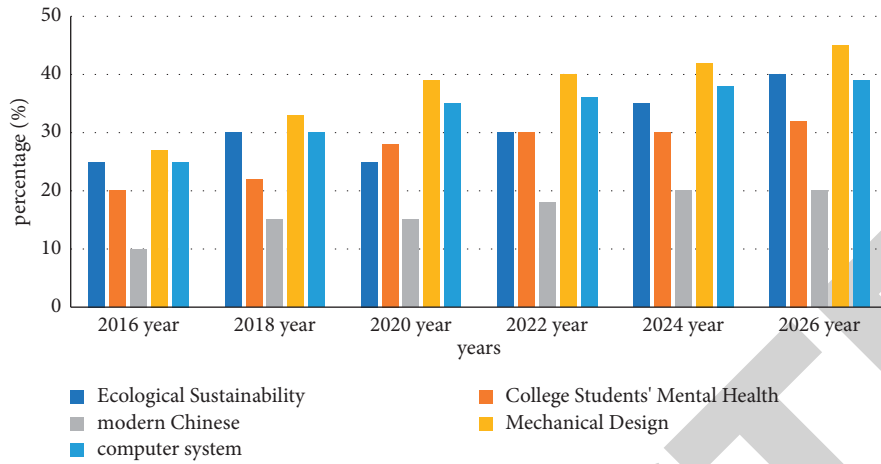
FIGURE 3: Ideological and political courses.
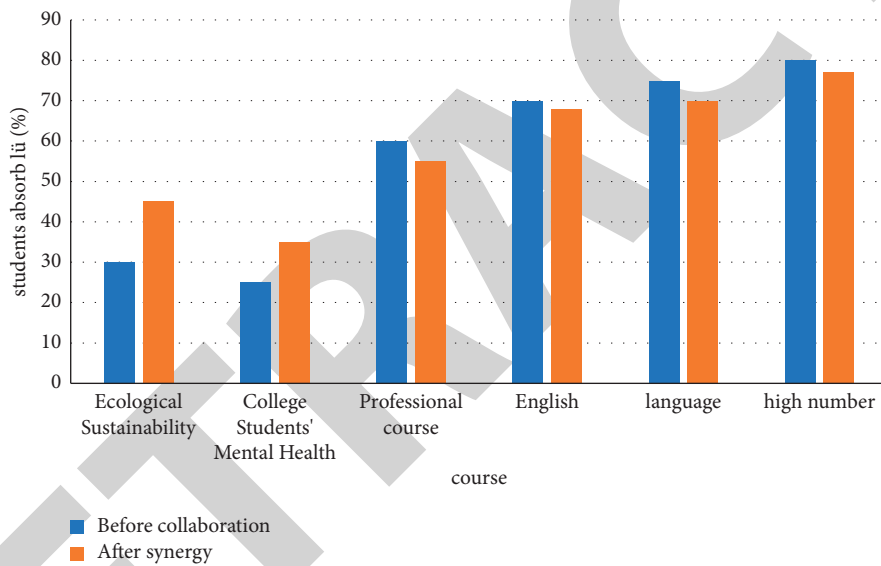
FIGURE 4: Absorption rate of students before and after.

TABLE 3: Analysis of fusion mode.

Three phases	Content
Before class	Online preparation based on web platform
After class	Offline teaching based on traditional classroom
After class	Extracurricular supplements based on practical activities

TABLE 4: Pollution changes.

Pollution source	Changes	Reason
Air pollution	25%–20%	Businesses take advantage of clean combustion sources
Soil erosion	18%–15%	Students save water every day
Greening reduction	8%–7%	Students are very young using disposable chopsticks
Acid rain formation	3%–2.5%	Less frequent use of coal
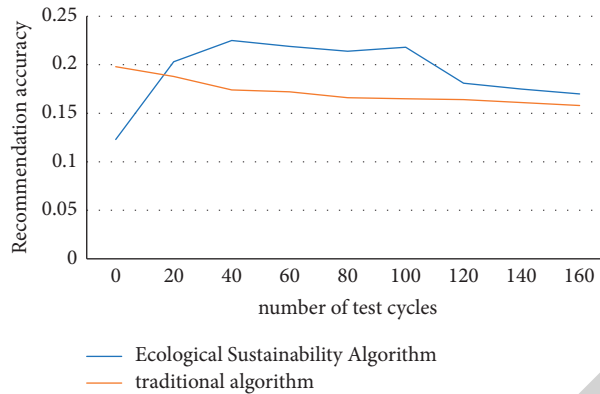
Figure 5: Comparison of the accuracy of the two recommendations before and after optimization.
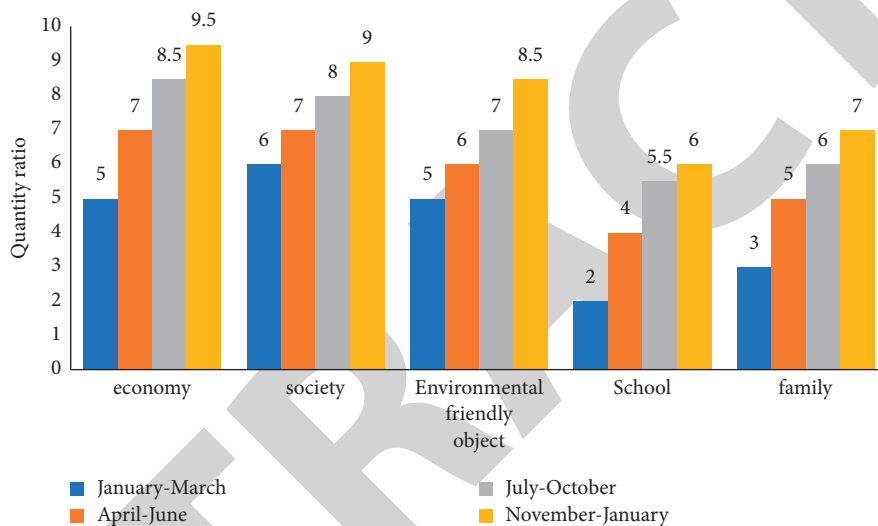
Figure 6: Analysis of the actual effect.

compared the model proposal's real impact on the curriculum of political thought schools, confirming that it is general and objective.

From the above data in Figure 5, it can be seen that the more times the ecological sustainable development algorithm is run, the higher its overall stability, so it is very suitable to use this algorithm. Finally, if you want to make college students effective, you can start from the following points in Figure 6:

After completing the ideological and political courses of ecological sustainable development, college students have produced many good changes in their actions. In terms of environmental protection, they learned to use less disposable chopsticks, know what kind of garbage to throw in which trash can when throwing garbage, and so on. In school, they learned to save food and turn off taps in time. At home, they would appeal to parents, acting together for ecological and economic sustainability.

It can be seen that all these points have increased in this year, which shows that the implementation effect analysis of college curriculum ideology and politics under the background of ecological sustainable development is very good, and it can continue to develop in the future.

5. Conclusion

The theme is the analysis of the implementation effect of college curriculum ideology and politics under the background of ecological sustainable development, which discusses the definition of ecological sustainable development, the principles of ecological sustainable development, and the significance of developing ecological sustainable development. Design and experiment the ideological and political research model of colleges and universities under the ecological sustainable development, and design experiments so that many students can recommend an ideological and political course for them to learn when they hesitate in colleges and universities, although ecological issues are now integrated into college ideological and political courses. There are many problems, but due to the development of the form and the times, it will be solved sooner or later. Now we should seize the opportunity to improve the usefulness of this theme, strengthen the ideological and political development of the future ecological sustainable development of colleges and universities, and make up for it. Its shortcomings pave the way for its rapid development in the future.

Research Article

The Influence of Identity and Management Skills on Teachers' Well-Being: A Public Health Perspective

Huiqing Zhang (ID)

Faculty of Education, National University of Malaysia, Bandar Baru Bangi 43600, Malaysia

Correspondence should be addressed to Huiqing Zhang; p112852@siswa.ukm.edu.my

At present, the state and society pay more and more urgent attention to higher education, and higher education has transitioned from elite education to mass education. College teachers, as the main force in the construction and development of colleges and universities, have the right to pursue professional happiness. Their professional happiness is not only related to themselves but also related to the growth of college students and the development of higher education. Therefore, this paper deeply studies the connotation of teachers' professional happiness, analyzes the current situation of their professional happiness, the current happiness level of college teachers, and discusses the strategy of improving college teachers' professional happiness, which has great value and significance to the development of national higher education.

1. Introduction

University professors who have a sense of well-being are more passionate about their university teaching profession and are better able to teach professional knowledge, while they can spread more positive energy and convey the right outlook to university students, laying a good moral foundation for them to enter society. So university professors, as a public profession, influence the moral and intellectual well-being of the future mainstay of society, and their well-being is a public health issue. This paper is, therefore, appropriate for this journal.

Nowadays, the state and society are paying more and more urgent attention to the quality of education. The report of the 18th National Congress of the Communist Party of China emphasized that education is the cornerstone of national rejuvenation and social progress. As an important part of education, higher education has transitioned from elite education to mass education and has trained and delivered a large number of high-quality talents to the country [1]. College teachers are the main body of college development and the first resource of education. Only with the backing of outstanding college teachers can colleges and universities achieve stable development. Whether college teachers can devote themselves to teaching with a full and enthusiastic attitude largely depends on their professional well-being. If teachers do not have high professional happiness, there will be no high-quality work with an innovative and selfless spirit, which will also directly affect the quality of higher education.

On August 11, 2014, Tencent Education launched a survey on the living conditions of teachers. It collected nearly 420,000 questionnaires from teachers in schools through online surveys and surveys without sampling and testing in an attempt to show the current living conditions of teachers. Overall, more than 80% of teachers said that the work is heavy, reflecting the high pressure of work. Nearly 30% of teachers are in poor health and are in a state of fatigue. More than 90% of teachers are dissatisfied with their actual wages. About 40% of teachers' wages have not risen in three years, and nearly 70% of Cheng teachers believe that society does not respect the teaching profession, and nearly 50% of teachers say they will never let their children take up the teaching profession. Such survey results reveal that the current pressure, income, and social status of teachers in my country are not optimistic, and it is very difficult for the majority of teachers to perceive happiness in their occupations [2].

In recent years, research on teachers' professional well-being has gradually become a hot topic. Paying attention to the professional well-being of teachers in colleges and universities and exploring the attributions that affect teachers' professional well-being are of positive significance for improving teachers' management policies, ensuring teachers' physical and mental health, maintaining teachers' sustainable development, and stabilizing the teaching staff. Through the analysis of the research fields, it can be seen that most of the current research focuses on the occupational well-being of teachers in primary and secondary schools, while the research on the occupational well-being of teachers in colleges and universities is still insufficient. Therefore, this paper focuses on the impact of identity and management skills on teachers' well-being [1, 3–5]. Through the interview and survey of the occupational health status of university teachers, the current happiness level of university teachers is understood, and the corresponding research strategies are proposed based on the research results, which is of great value and significance to the development of national higher education.

2. State of the Art

2.1. Happiness. Well-being is the science of good human existence. The study of well-being in the field of psychology began in the 1990s and 1990s, represented by Western countries. The research on well-being stems from the birth of a new school, positive psychology, advocated by the psychology community [6]. Positive psychologists believe that happiness is the most basic emotional need of everyone. The World Federation of Mental Health also includes the standard of happiness as one of the four standards of mental health. There are also different schools of view on happiness in my country. Among them, the schools of certain representative significance include Confucianism, Taoism, and Buddhism as shown in Table 1

In his writings, Marx expounded the Marxist concept of happiness, believing that if people can choose the labor occupation that can best benefit mankind and contribute to the development of mankind, then difficulties and setbacks will not knock people down because that kind of happiness belongs to the masses, all those who are helped, not selfish, limited, and noble people will shed hot tears in the face of the ashes of those who are dedicated. From the interpretation of this classic concept of happiness, it can be seen that the people-oriented concept of Marx's concept of happiness is the theoretical basis, collectivism is the ultimate goal, and overall consideration is the fundamental method [7].

The theory of happiness is used to study the happiness level of college teachers so as to understand the mental health problems of college teachers. With the people-oriented world theme and the continuous advancement of my country's quality education, my country's education has gradually entered an era of focusing on student development. For a long time, the focus of research in the education sector has been mainly on the development of teachers' professionalism in order to further standardize the teaching staff, to better serve society and students, ignore the concern

for teachers' spiritual life, and lack humanistic care for teachers' pursuit of a happy life. However, in recent years, the academic community has gradually realized the consequences of this neglect, and the quality of life of teachers, especially the problem of teachers' well-being, has increasingly come into people's perspective [8]. At present, the definition of teachers' well-being can be roughly divided into three categories: one is the concept of subjective well-being, which is based on the philosophy of "happiness theory," which refers to an individual's overall evaluation of his life according to his own standards and emotional experience. Its operational indicators include life satisfaction, positive affect, and negative affect. Xiao Jie's definition of teachers' well-being falls into this category. He proposes that teachers' professional well-being is the continuous and stable happy experience of teachers' work based on their own standards. Another category adopts the concept of psychological well-being, and its philosophical background is "realization theory." Psychological well-being emphasizes the full realization of people's potential and emphasizes people's positive self-esteem, social service, the purpose of life, and the universal significance of friendly relationships, which constitute the core elements of psychological well-being [9].

In this paper, happiness is defined as the personal satisfaction obtained by people in the social practice of creating living conditions due to the realization of personal, collective, and even human goals, ideals and justice, and public welfare. Happiness is the warm flow of passion between people from the heart to the deep sea of love; it is the simplicity of kind people. When people pay the sweat of responsibility, their foreheads must emit the light of happiness. In short, happiness is the feeling that people's desires are satisfied or partially satisfied, a kind of spiritual pleasure. Happiness is a subjective feeling of life satisfaction.

Teachers' professional well-being is produced by individuals engaged in educational and teaching activities and obtained after realizing their own values and exerting their own strengths experience. It is not only an important content of teachers' professional life but also an important criterion for evaluating the quality of their work and life [10]. Because happiness comes from identity, and teachers' happiness comes on the one hand from students' identification of their work, and on the other hand, comes from the social identity of their own identity.

2.2. Identity. Identity phenomena are very common in social life, such as social identity, cultural identity, national identity, national identity, and political identity. "Identify" has two meanings in modern Chinese: one is to feel kindly because of the common ground with oneself, and the other is to admit and recognize. At present, we can divide the interpretation of identification into two categories. The first category is to equate identification with "self-identification," that is, an emotional driving force for individuals to establish connections with others and a need to seek psychological safety. The second category of explanations, such as James, Freud, Zhu Zhixian, Liang Liping, etc., equates identification with "the establishment process and result of self-concept,"

TABLE 1: Different schools of thought on happiness.

Representative school	The main point of happiness
Confucianism	Advocating morality as the root of all things, happiness is no exception. Take virtue as happiness and happiness as the thought of happiness, and everything is good.
Taoism	It is advocated that everything should be natural, not to be forced, to be pure of heart and few desires, to look at everything in a plain way, to be happy, and to be one with happiness naturally.
Buddhist	It is advocated that letting nature take its course, happiness comes from the heart, and whether happiness is a subjective idea of oneself. Looking at the world plainly, calming down your mind, and properly controlling your mind will bring you happiness.

that is, the process of individual personality self-formation, which refers to the moral field of adolescents or children. Psychological adaptation mechanism [11]. As explained in the American Psychological Encyclopedia, teachers' professional identity is teachers' awareness, emotion, expectation, will, values, and perception of their own professional skills. Teachers' professional identity is both a process and a state. As a "process," a teacher's professional identity is the process in which the individual self gradually develops from his own experience and confirms his role as a teacher.

2.3. Management Skills. Teacher education management ability refers to a kind of behavior performance in the management process established and maintained by teachers in order to achieve the teaching objectives. The level of teachers' educational management ability directly affects the quality of teachers' teaching and also greatly promotes or negatively affects students' learning. Teachers are the main force in curriculum reform and the key to basic education curriculum reform, and teachers' educational management ability is an important guarantee for teachers' effective teaching [12, 13]. As a teacher not only must master the relevant professional knowledge and professional skills but must also have certain appropriate teaching abilities only in order to carry out effective classroom teaching, to ensure the smooth realization of educational and teaching goals, to comprehensively improve the quality of teaching, and strive to cultivate qualified talents for building a harmonious society. Classroom teaching ability is a direct and effective tool and means to complete teaching tasks, and it is the concentrated expression of teachers' education and teaching ability. This is not only related to the overall improvement of the quality of education and enrollment but also directly related to the development of students' thinking ability. It can be said that classroom teaching ability is the basic ability that teachers must possess, an important part of teachers' professional ability, and also directly affects the classroom. The efficiency of teaching activities improves the classroom teaching ability to successfully complete the classroom teaching activities.

2.4. Influencing Factors of Teachers' Well-Being. Scholars at home and abroad have conducted relevant research on the influencing factors of teachers' well-being from various aspects, and the research results are basically consistent. According to the research, the influencing factors of

teachers' well-being can be roughly divided into the following categories: Demographic variables include age, gender, school type, marital status, professional title, etc. The results of a survey on the occupational well-being of Dutch teachers show that the elderly teachers have a very high level of well-being. Teaching subjects and teachers' own level will cause the biggest difference in teachers' occupational well-being. Teachers in vocational schools have the lowest level of well-being. The ones who are teachers of special courses in comprehensive middle schools. The study found that the relationship between job satisfaction and age, which is a measure of job well-being, is in the form of a U-shaped curve. The results of the domestic questionnaire survey on the subjective well-being of primary school teachers show that there are significant differences in the subjective well-being of the genders, male teachers' well-being is higher than that of female teachers. Yang Wanqiu's research on the subjective well-being of primary and secondary school teachers found that there are significant differences in the subjective well-being of primary and secondary school teachers in terms of regional factors where teachers come from. Cao Guanghai's research on the subjective well-being of higher vocational teachers found that higher vocational teachers of different genders, ages, professional titles, and marital profiles, while this paper mainly explores the happiness level of college teachers from the two factors of identity and management skill level.

3. Interview Survey on the Current Situation of Professional Well-Being of College Teachers

3.1. Basic Situation. In order to gain an in-depth understanding of the current status of teachers' professional well-being in a certain college and then explore the reasons for the happiness and unhappiness of college teachers, and seek strategic help for the improvement of teachers' happiness, this study selects 300 teachers from a college with different backgrounds and uses the following methods. The interview method combines quantitative research with qualitative research to jointly study teachers' professional well-being in order to provide a qualitative research basis for the questionnaire survey and improve the authenticity of this paper. The basic information of teachers is shown in Table 2 and Figure 1:

After sorting out and analyzing the salary part of teachers' happiness satisfaction in the survey data obtained, relevant conclusions can be drawn. The salary level of

TABLE 2: Basic information of teachers.

	Basic situation	Number of people (people)	Proportion (%)
Gender	Female	226	75.3
	Male	74	24.7
Age	30~33 years old	21	7.0
	34~36 years old	79	26.3
	37~40 years old	106	35.3
	41~44 years old	74	24.7
	45~48 years old	20	6.7
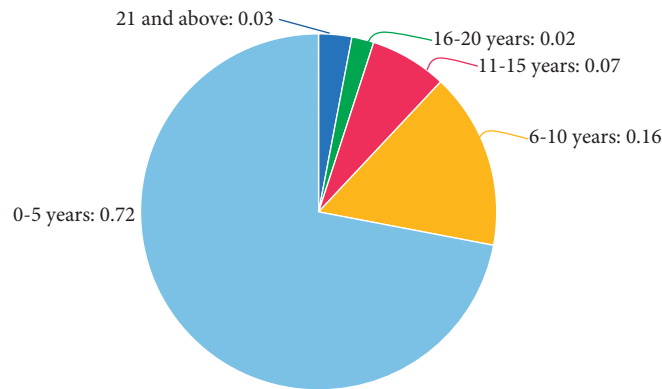
FIGURE 1: Teachers' teaching age.

teachers is unevenly distributed, and the number of people in the four grades is different. Only 46% of teachers are relatively unsatisfied with the current salary level. Satisfied, the specific data is shown in Figures 2 and 3.

3.2. Happiness Survey. According to the teachers' targeted survey and statistics on the happiness of each part of the teaching and work, survey and research on various aspects of happiness, and explore happiness from multiple dimensions, as shown in Table 3:

After sorting it into a chart, it is found that teachers' happiness in terms of the working environment and salary treatment is significantly lower than in other aspects, and there is a lot of room for improvement. This is mainly because the salary level of college teachers is relatively not high, the working environment is affected by the level of universities, and there are certain differences, resulting in the following results. See Figure 4 for details.

Moreover, teachers of different genders also have great differences in happiness. It can be seen that the happiness index of female teachers is higher than that of male teachers, and the happiness rate is higher, as shown in Figure 5:

In order to understand whether there are differences in the well-being of teachers of different genders, an independent sample test was used to conduct variance analysis. The test results are shown in Table 4.

As can be seen from Table 4, the happiness index of teachers of various genders is generally at the upper middle level (total score is 7), but there are significant differences in
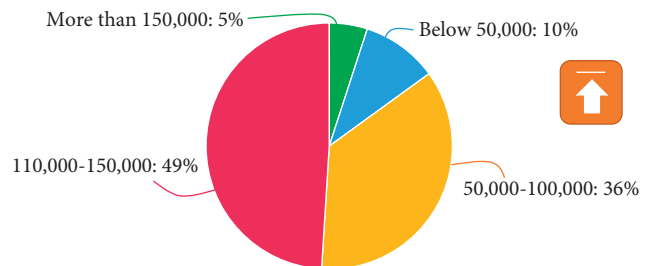
FIGURE 2: Teacher salary levels.
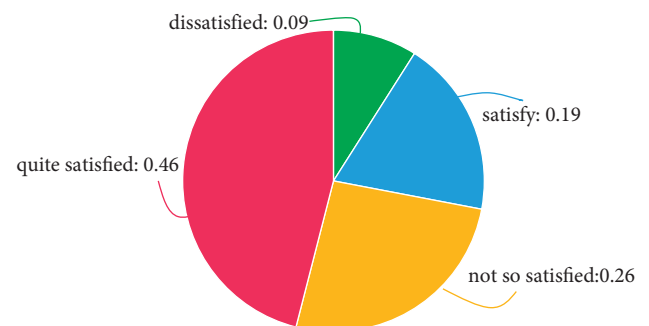
FIGURE 3: Teachers' salary satisfaction.

the level of happiness of teachers of different genders. Among them, the happiness index of female teachers is 5.61, which is higher than the male happiness index of 5.03, mainly because the social pressure on men is greater than that on women.

TABLE 3: Meanings of various aspects of happiness.

Module	Dimension	High scorers explained
Subjective well-being	Life satisfaction	The individual's needs and desires are met in all aspects, and the individual is satisfied with his or her life situation
	Positive emotions	More time to experience positive emotions such as love, joy, happiness, pride, optimism, etc.
	Negative emotions	Experience more negative emotions such as depression, anxiety, jealousy, anger, guilt, etc.
Psychological well-being	Vitality	Full of energy, feeling of energy, with a passion for life, full of energy
	Health concern	Cherish life, pay attention to health, maintain a good way of life and behavior
	Altruistic	Be willing to help others, be caring, and hope to make the world a better place through their own efforts
	Self-worth	Believing in one's own abilities and importance, having a sense of accomplishment and worth, and having high self-esteem
	Friendly	Relationships have warm, safe, genuine, lasting relationships
	Personality	Growth, self-acceptance, continuous development, openness to new experiences, self-awareness, ability to control one's own behavior
Happiness index		Feeling very happy throughout life
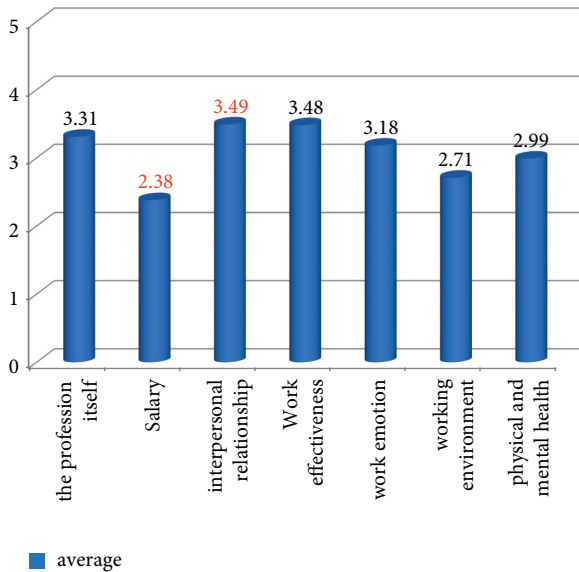
FIGURE 4: The happiness index in different aspects.

FIGURE 5: The happiness index of different genders.

TABLE 4: Differences in subjective well-being of teachers of different genders.

Gender	M	T	P
Male	5.03	−3.265	0.002**
Female	5.61		

4. Result Analysis and Discussion

After analyzing the survey results, it is found that the overall subjective well-being level of college teachers is at a high level, which may be related to the professional characteristics of college teachers: college teachers are a special group responsible for teaching, scientific research, administrative management, and service. Teachers who are competent for this position are selected from outstanding applicants, with high comprehensive quality in all aspects, and the age of the teaching team is gradually showing a younger trend, able to actively and effectively deal with pressure and resolve negative emotions. In all dimensions of happiness, the respondents showed higher scores, which may be related to the living environment and work characteristics of college teachers. The friendly and altruistic working environment of college teachers, whether it is teaching and scientific research

or management and service work, requires strong group collaboration. In a good working atmosphere, self-worth and health and vitality are more likely to be improved. The two are a virtuous circle of mutual promotion, which can jointly improve the well-being of college teachers.

The professional identity of college teachers is highly correlated with teachers' happiness. The specific rule is that the higher the degree of teachers' professional identity, the higher the level of happiness, and the specific experimental results are shown in Table 4. At present, there are few domestic studies on the relationship between the two. Yu Songhua and others have done a related study on teachers'

professional identity and happiness index and found that teachers' professional identity and its factors are significantly positively correlated with teachers' happiness index. The research results are basically the same. Teacher teaching is the most important job for teachers, and teaching is a way for teachers to achieve personality growth and obtain positive emotions. When teachers cannot agree with this job, it means that teachers cannot accept it. The self in the teaching process cannot be developed freely in teaching, nor can one experience positive emotions such as joy, happiness, and pride in teaching, and the idea of resignation arises spontaneously. It can be seen that personality growth and positive emotions are the most direct factors in the process of resignation intention, while occupational identity indirectly affects resignation intention due to its great influence on personality growth and positive emotions [14–17].

The improvement of teachers' management skills will improve teachers' classroom comfort, teachers' classroom atmosphere is good, and students' interest in learning is high so that both parties can experience happiness in the process of education, teaching, and learning, and teachers' happiness will also be improved accordingly. Therefore, improving teachers' management skills is of great significance to improve teachers' well-being.

5. Suggestions for Improving the Well-Being of College Teachers

5.1. Create a Humanized Campus Atmosphere and Create Harmonious Interpersonal Relationships. Social attributes are the basic attributes of people, and society has a huge impact on people, including not only personal development but also happiness. Colleges and universities are small societies where teachers work and live. Teachers' interpersonal relationships are mainly divided into leadership relationships, teacher-student relationships, and family relationships. These relationships have an important impact on teachers' subjective well-being. As university leaders, we can effectively improve teachers' subjective well-being around these aspects. School leaders and all teachers should work together to create harmonious interpersonal relationships and build a people-oriented campus atmosphere. First of all, the leadership team of the school must reach a consensus, set an example first, form spiritual cohesion, and take overall consideration when distributing honors and awards, so as to enhance the harmony of interpersonal relationships between faculty and staff; it is necessary to promptly resolve any unhealthy trends that may exist among teachers. It is necessary to stop it in a timely manner and criticize some teachers in a timely manner when they need to be criticized; at the same time, it is necessary to create cooperation opportunities among teachers, weaken competition, relieve teachers' professional pressure, and help teachers work and live happily. Secondly, teachers should pay attention to communication with colleagues and students. Schools can create a platform for teachers to communicate with each other. Through communication, teachers can strengthen cooperation and friendship, resolve existing misunderstandings in a timely manner, and build harmonious relationships with colleagues; communication can timely understand students' learning and psychological conditions, make their teaching content more targeted, and can also form an atmosphere of mutual understanding and mutual support between teachers and students, and create a harmonious teacher-student relationship [18].

Colleges and universities should not only promote the healthy growth of students by creating a good and positive school spirit and study style, but also encourage teachers to devote themselves to their work by creating a vibrant and harmonious educational and teaching atmosphere. Therefore, colleges and universities should fully respect and understand the reasonable needs of teachers and provide more training and further study opportunities while helping them solve their difficulties in life so as to help them better realize their own development and adapt to education, teaching, and subject professional development. It should build a platform for promoting teachers' self-development and self-value. While encouraging teachers to put forward reasonable demands that are conducive to education, teaching, and scientific research, they should strictly urge relevant departments of the school to assume the responsibility of serving teachers.

5.2. Improve Teachers' Salary Level and Academic Reward Level. Colleges and universities should establish a "people-oriented" management concept, create a teacher performance assessment system based on the different requirements for teachers at different levels, and adopt a variety of assessment methods to conduct targeted assessments on teachers' teaching and scientific research; at the same time, follow the teaching work of higher education. Guided by modern human resource management theory, the transparency of teachers' performance assessment and evaluation will be further improved so as to make a more objective and fair evaluation of teachers' work performance.

The work level of personnel managers in colleges and universities directly affects the quality of personnel work in colleges and universities. In order to formulate a scientific and standardized management system and implement it smoothly, personnel management workers in colleges and universities need to have solid management professional knowledge and skilled professional skills, as well as master advanced management methods; they also need to accumulate rich humanities and social sciences. Knowledge, uphold justice, abide by professional ethics and guidelines, and be good at communicating and communicating with teachers on an equal footing [19]. Therefore, colleges and universities should actively create opportunities for vocational training for personnel management workers, not only focusing on the training and improvement of their professional ability but also on the training and improvement of their professional ethics and interpersonal skills so as to facilitate the smooth operation of personnel management in colleges and universities and lay a good foundation for development.

Although material conditions cannot directly determine an individual's subjective well-being, it is an indispensable

and important factor. In the interview, it was also found that the salary of college teachers is not equal to their work, and many teachers hope to improve their salary. Therefore, the competent education department should comprehensively consider the social and economic level and price level, adjust teachers' salaries in a timely manner, improve teachers' living standards, and relieve teachers' worries about their work. In addition, interviews with teachers with different professional titles also found that professional titles have a greater impact on teachers. Many teachers hope to improve their scientific research ability through training opportunities and reward mechanisms. Therefore, schools can consider providing teachers with more scientific research exchanges and cooperation, provide teachers with better scientific research resources, set up a reasonable scientific research assessment mechanism, increase the reward mechanism, and enhance the enthusiasm of teachers in scientific research, thereby improving teachers' scientific research ability and allowing more teachers to experience higher levels in the process of self-realization and subjective well-being.

5.3. Pay Attention to the Well-Being of Young Teachers in Colleges and Universities. For young teachers in colleges and universities, although they have a relatively high social status among their peers, their economic income level is not equal to it. There has been a study that the overall income of college teachers belongs to the upper middle level, but the phenomenon of polarization is more obvious: the income level of college teachers with high positions, high professional titles, and scientific research backbones is higher, while the income of young teachers is often low. Young teachers also need to bear high-intensity work pressure, housing prices, and various family pressures, so their subjective well-being is not optimistic. For the new young teachers in colleges and universities, they have to bear all kinds of pressure. For colleges and universities, they should attach great importance to the work and life status of young teachers, and create a reasonable promotion channel, excellent resource support, and harmonious interpersonal atmosphere for them, a fair evaluation system, and at the same time, pay attention to the difficulties in their lives and solve them in time, so as to alleviate the "worries" of young teachers so that they can work in a good mental state to make greater contributions [20].

In addition to spending a lot of time with students, teachers spend the rest of their working time basically spending time with colleagues. Maintaining a good relationship with colleagues is an important foundation for teachers to carry out their work. Therefore, colleges and universities should vigorously advocate sincere treatment among colleagues and maintain a good cooperative attitude and guide teachers to form a humble and prudent way of doing things and an enthusiastic and open positive attitude, so that teachers can appreciate the advantages of colleagues and correct their own shortcomings. When problems arise, they can deal with them calmly and peacefully and can ensure smooth communication among colleagues with good communication methods so that teachers can gain comfort and happiness in their interactions with colleagues.

5.4. Establish Teachers' Professional Well-Being. Teachers have always been considered the most sacred profession in the world. What they face every day is not machines that cannot speak but many young, energetic, and promising young people. Teachers' work includes a lot of interaction between teachers and students, and teachers' words and deeds influence students in various ways. When students finish their studies, leave the campus, go to work, and contribute to national development and social progress, "Education of the world's talents," at this time teachers' sense of achievement and happiness is the highest.

Colleges and universities can establish an active support system by establishing a teacher's physical and mental health evaluation system and regularly collect, analyze, process, store, extract, and evaluate teachers' relevant information. Through this active support system, active support is provided to teachers with problems in the early stage of teachers' physical and mental health assessment to avoid the deterioration of the situation; at the same time, for teachers with problems, it is further confirmed whether they are in a state of crisis through psychological examination; Teachers who are confirmed to be in crisis will be provided active support services by relevant school departments through psychological counseling or workshops.

5.5. Reasonably Release Pressure. In the face of heavy education, teaching, and research tasks, as well as the objective pressure of interpersonal communication with students, colleagues, and school leaders at all levels, teachers will have a greater ideological burden in their professional behavior. Therefore, for colleges and universities, it is imperative to build an efficient communication platform for two-way interaction between front-line teachers and school administrators. A good relationship between superiors and subordinates can help reduce teachers' interpersonal pressure. The open and two-way interactive communication channel is not only an effective way for school managers to directly understand the demands of front-line teachers, but also an effective way for teachers to release work pressure. Through a two-way interactive and efficient communication platform, on the one hand, school administrators can keep abreast of teachers' teaching environment so as to eliminate unfavorable factors affecting their professional behavior as much as possible for teachers; on the other hand, teachers can timely understand and grasp the implementation of school administrators It lays a good foundation for the efficient realization of educational and teaching goals.

As contemporary, in addition to enjoying the convenience and comfort of various modern technologies, we are also bearing various life pressures, social responsibilities, and family burdens. Individuals who are under multiple pressures need to expand their stress relief channels and learn to seek help in a timely manner for those who need help in the workplace or in the collective; at the same time, family and friends are an important part of individual stress relief and social support. A person with a good social support system, even if he encounters setbacks or failures, will turn adversity into prosperity, from misfortune to happiness. In addition to

the benign support from the external environment, individuals should also find more reasons for themselves, set reasonable goals, and choose work content in a targeted manner. Enhance your ability to deal with stress and confusion. As a college teacher, in fact, the characteristics of work have more advantages than ordinary people, and teachers often have more free time for their own disposal. It is a good way to learn to use this time reasonably and effectively. You can choose appropriate exercise methods to regulate your body and mind, and you can use this time to improve and optimize your social support system so as to maintain a good physical and mental state, enhance your ability to cope with stress, and gain higher happiness experience. No matter what kind of work pressure is faced, teachers should treat their work with a positive and optimistic attitude, and at the same time, should also have more brave perseverance and courage. The domestic society has always been biased towards education and may not necessarily hold a positive attitude towards the teaching profession. This social reality has a negative impact on the professional identity of college teachers. Teachers should accept the reality, abandon the prejudice against school students, teach hard, and prove the value of the teaching profession with their own practice. When teachers encounter difficulties in work and life, they can accept help from the school or others, but more fundamentally, they should face problems with optimism and open-mindedness and learn to relieve various negative emotions by themselves.

5.6. Improve the Identity of Teachers. Pay attention to planning, meet the needs of teachers' occupational safety, and enhance teachers' professional identity. Colleges and universities should clearly recognize that an excellent team of teachers has a guarantee of teaching quality, which is also the core driving force of school development. Therefore, "doing a good job in human resource planning, improving teachers' treatment, and reducing the loss of excellent teachers" should be a key work of colleges and universities. Due to the low antirisk ability and unclear development goals of colleges and universities, also because the teacher is a career that needs to progress with time, the level of personal ability will also cause teachers to have a low sense of occupational security. Therefore, the organizers of colleges and universities should make long-term plans for the development of the school, clarify the development path of the school, and strive for the long-term and stable development of the school. Only in this way can a solid career development platform meet the "safety needs" of teachers, enhance their sense of occupational security, and cultivate their sense of belonging to the school, which has a positive effect on promoting the stability of the teaching staff in colleges and universities.

6. Conclusion

In the current environment of paying more and more attention to higher education, the happiness level of college teachers directly determines the work quality of college education.

This paper deeply studied the connotation of teachers' professional happiness, analyzed the status quo of teachers' professional happiness and the current happiness level of college teachers, and found that college teachers have lower happiness in salary and working environment, and the happiness index of women is higher than that of men. Based on the above research conclusions, the paper also discusses the specific strategies for improving college teachers' professional happiness, which is of great value and significance to the development of national higher education.

Data Availability

The labeled data set used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Retraction

Retracted: Study on the Construction and Development Path of Gymnasiums considering Ecological Environment Restrictions

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

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Research Article

Study on the Construction and Development Path of Gymnasiums considering Ecological Environment Restrictions

Xiaming Chen,[1] Linhong Zheng,[1,2] and Yueyun Xu [1]

[1]Quanzhou Normal University, Quanzhou 362000, China
[2]Centre for Sport and Exercise Sciences, University of Malaya, Kuala Lumpur 50603, Malaysia

Correspondence should be addressed to Yueyun Xu; xyyulk@qztc.edu.cn

Under the restriction of ecological and environmental factors, our requirements have improved for the development path of gymnasium construction. According to the previous way to carry out the development path of gymnasium construction will make our construction work encounter a lot of unnecessary troubles, so we can improve the success rate of the development path of gymnasium construction under the constraints of the ecological environment by carrying out relevant evasive operations according to the constraints of ecological environment. The topological path and path algorithm used to improve the efficiency of stadium construction and development path under the constraints of ecological environment, TEG algorithm, Q-TEG model, Q-TEG algorithm, Dtra algorithm, TraD algorithm, ResR algorithm, and Q-TED algorithm used in resource reservation plus time slot plus hosting bring the following advantages: (1) we use topological path and path algorithm to explore topological representation methods suitable for development path. The overview provides a theoretical basis for guidance, for forwarding technology scheduling mechanisms and multi-path forwarding mechanisms to provide higher flexibility. (2) We use the TEG algorithm of resource reservation plus time slot plus trusteeship, Q-TEG model, and Q-TEG algorithm under multi-model model can deal with the capacity and link of queue in each stadium construction development path well. It is more convenient to set the packet loss threshold for the propagation experiment tested in the simulation. Better help gymnasium construction and development path transmission is successful. (3) The use of the Dtra algorithm, TraD algorithm, ResR algorithm, and Q-TED algorithm in our stadium construction development path of a good deal of the transmission link structure between each node, so that the transmission efficiency between nodes becomes higher, making our stadium construction development path operation more efficient and convenient.

1. Introduction

The arid land in western China needs to be improved urgently, and the ecological environment in this arid area is of great significance to the implementation of national strategies and policies, the maintenance of social order, and the integration of land [1]. The research on ecological environment change, ecological environment degradation mechanism, and ecosystem regulation and control in the arid area can improve the structure and function of the ecosystem in spatial structure and ecosystem. There are signs of swamp degradation in Zoige Plateau, and the regional ecological environment and swamp ecosystem are seriously damaged, which is difficult to be restored by self-repair and artificial restoration. The deterioration of the ecological environment and swamp degradation cause the decrease of rare animal species and population, which provides the possibility for human activities to interfere [2]. The great decrease of phosphate concentration in Daya Bay leads to malnutrition level of seawater quality, and the seawater quality in the water system changes from nitrogen regulation to phosphorus regulation. The change of nutrient concentration in Daya Bay will lead to the miniaturization of the plant community [3]. Ecological fragility and agricultural activities jointly affect crop production in dry fields in the western Loess hilly and gully region. Effects of soil moisture and fertilizer content at different depths on slope and terrace ecology in Loess Plateau [4]. Muscle weakness and

mechanical restriction can explain the decline of eyeball rotation and other common restrictions. The measurement of forced intraocular pressure difference and the study of saccade speed are helpful to record the existence of limitations. Limitation occurs after multiple ocular stiffness surgery caused by orbital floor fracture, orbital or retinal detachment surgery, and muscle displacement surgery [5]. A field experiment was conducted to study the soil nutrient restriction factors and plant nutrient absorption and accumulation of super-high-yield summer maize. The results showed that super-high-yielding summer maize could obtain better productivity under the influence of nutrient constraints; the growth period of super-high-yielding plants increased; and nutrient accumulation was the key period of nutrient absorption at the maximum maturity of the growth period [6]. Mass production of high-quality seeds, as a biological study of clonal seed orchards with obvious planning restrictions, can understand the flowering biology of oak trees with stems and produce high-quality seeds with high genetic diversity. Clones with different genotypes are helpful for pollination and ensure successful fertilization of seed quality and quantity. It is also important to synchronize the flowering and phenology of clones. The germination of oak stem buds is regulated by heredity, which provides the possibility for the correct selection of excellent trees [7]. E-government information resource sharing is the focus of national information system construction. At present, the main factors restricting the sharing of e-government information resources are insufficient information transmission, the low utilization rate of resources, and high cost of information sharing. Therefore, we should think about how to reform the means of information sharing services, strengthen the security management of information resource, and promote the development of e-government information resources sharing [8]. This section introduces some structures of Olympic venues. The structural schemes and corresponding construction technologies of these stadiums and gymnasium have genius thinking, which represents the discussion of the latest structural system of long-span spatial structures in China [9]. In order to ensure the high-quality completion of stadiums and gymnasiums construction and ensure the smooth holding of the national games, we can learn from the experience of stadiums and gymnasiums planning and construction in the past three national games through on-the-spot investigation and sorting out relevant documents at home and abroad. Based on the investigation of stadiums and gymnasiums in Shaanxi Province, the number, characteristics, overall layout, and construction methods of the required stadiums and gymnasiums are analyzed in detail, and then the functional orientation and construction standards of base facilities are put forward [10]. To provide scientific assessment and practical guidance for the construction and maintenance of sports lawns, mainly aiming at lawns that affect equipment maintenance in humid temperate climate. It describes general principles and has a section on identifying problems, components of drainage protection schemes, and functional implementation that can replace layout design guidelines [11]. The shortage of sports facilities in a region is reflected

not only in the lack of key facilities but also in the rapid growth of the number of similar facilities. The conflict between the construction of community sports infrastructure and the development of community sports reflects the disadvantages of traditional construction. Infrastructure construction should not only rely on increasing investment but also coordinate sports facilities resources of enterprises and institutions and pay attention to system management and soft environment construction. Reasonable layout of infrastructure to meet the inherent requirements of sustainable development [12]. In recent years, the development path of electromagnetic energy conversion technology has made relevant breakthroughs. The utilization and recovery of these environmental electromagnetic energy is the most relevant and critical issue in the practical application of wireless energy acquisition equipment and systems at present and in the future. A simple measurement of the linear frequency of RF rectifier elements is successfully derived from emitter analysis [13]. The analysis of the development path in the economic sample reflects the value in the process of economic development. We use flexible path selection methods, in order to solve these possible contradictions, we have introduced a variety of nonparametric display models [14]. The research of biomaterials, the first generation of artificial bone substitute materials, established the concept of paving the way for commercialization. A new concept of amorphization is put forward so that the maximum compressive strength of hydrated materials is about 78 MPa [15].

2. Related Narrations of Stadiums and Gymnasiums Construction under Ecological Environment

2.1. Problems in the Construction of Stadiums and Gymnasiums under Ecological Environment. The construction concept and development path of green venues based on ecological environment factors are starting, but at the same time, the destruction of the ecological environment is becoming more and more serious, resulting in very serious consequences. This situation brings great pressure to the development road of stadiums and gymnasiums in China. The negative impact of industrial development on the environment is unexpected. Although the economy has developed, it has sacrificed the environment, so serious ecological environment damage has appeared, which brings great resistance to the construction of stadiums and gymnasiums in China. Most data collection and analysis need to be based on real conditions, which poses a great challenge to the construction and development of our stadiums and gymnasiums. Because people's awareness of environmental protection has not been enhanced, it is difficult to walk out of a road of construction and development of stadiums and gymnasiums in an ecological environment.

2.2. Fundamental Guarantee for Stadium Construction and Development. The development path of stadiums and gymnasiums construction based on the ecological

environment needs conditions and good ecological environment as the support of the big environment behind it. The significance of ecological environment protection construction is the fundamental guarantee for the development of social civilization because the progress and development of human society are the result of the common development of ecological, spiritual, material, and political civilization. Various civilizations blend, interact, and restrict each other. Doing all these well provides unique conditions for the construction and development of stadiums and gymnasiums in China. If we do a good job in ecological environment protection, we can rationally redistribute resources. Allocating better and more suitable resources for the construction and development of stadiums and gymnasiums and doing a good job in ecological environment protection are of great benefit to the construction of spiritual civilization. People's spiritual level has been improved, which is a green and healthy state for sports undertakings and sports construction.

2.3. Establishing an Innovation Mechanism.

It is necessary to have a new mechanism to facilitate the construction and development of stadiums and gymnasiums in the ecological environment. It is an important measure to establish an innovative mechanism of ecological environment protection. It is necessary to deeply study the needs of ecological environment protection in the new period and innovate environmental protection to establish good starting conditions and good development conditions for the construction and development of sports. First of all, the environmental protection department should become the connector between the government and enterprises. It is necessary to publicize the government's laws, regulations, and policies on environmental protection to enterprises. At the same time, we should report to the government the difficulties in environmental protection in the production and operation of enterprises and then find a balance between the government and enterprises so that relevant departments can join in as new forces and become new mechanisms and complete the innovative mechanism of ecological and environmental protection in the prevention stage so that the construction and development of our gymnasium will have more comparative advantages. A good mechanism can make the investment in gymnasium construction more effective and attract more capital. The accumulated investment in large-scale stadiums and gymnasiums in Fujian Province is 9.034 billion yuan, accounting for 30.72% of the investment in stadiums and gymnasiums in Fujian Province. Among them, the financial allocation is 5.828 billion yuan (only the sports charity fund allocates 426 million yuan, accounting for 7.32% of the government financial allocation), accounting for 64.51%. Self-raised funds are 2.753 billion yuan, accounting for 30.47%; social donations are 345 million yuan, accounting for 3.82%; and other investments are 10.91 billion yuan, accounting for 1.20%. Better mechanisms are conducive to investment in gymnasium construction.

3. Algorithm for the Development Path of Stadium Construction

3.1. Changes in the Development Path of Stadium Construction.

When operating the development path of stadiums and gymnasiums, it meets the time certainty requirement of each sports construction path to the delay of subpaths. Generally, to achieve this goal, it is necessary to set the simulated relative coordinates according to the azimuth effect and optimize the relative position of the working path. One-to-one or one-to-many data transmission required for the construction and development channel of stadiums and gymnasiums is more convenient. In addition, because the gymnasium construction path can be backed up through multi-path transmission, the transmission location is often simplified to the description location. The relative position system divides the path space into grids and uses the grid method to represent the relative position. Based on the relative position, the following development path is constructed:

$$\begin{cases} X = (N + \text{alt})\cos(\text{alt})\cos(\text{lon}), \\ Y = (N + \text{alt})\cos(\text{alt})\sin(\text{lon}), \\ Z = \left(N(1 - e^2) + \text{alt}\right)\sin(\text{lat}), \end{cases} \quad (1)$$

where e is the offset rate of the reference relative position and N is the path value of the reference rate, and formula (1) is the decentralized calculation for calculating the path propagation of gymnasium construction. The relative coefficient of gymnasium construction is calculated with reference to the specific parameter value of gymnasium construction, and the specific calculation formula is as follows:

$$e^2 = \frac{a^2 - b^2}{a^2}, \quad (2)$$

$$N = -\frac{a}{\sqrt{1 - f(2 - f)\sin^2\text{alt}}}. \quad (3)$$

Because we need to arrange the path planning algorithm of the gymnasium before carrying out the development path of stadium construction, we also need to calculate the coordinates of relative positions on the grid map. If we can use coordinates to study the gymnasium construction path, it will greatly improve our resource utilization rate. It is more efficient to select the task area and specify the target for related operations according to the task needs.

In the relative path construction of a gymnasium, there is a functional relationship between the extreme flattening rate $f = (a - b)/a$, the eccentricity distance e, and the extreme flattening rate f, and the maximum and minimum values of this functional relationship can be transformed by linear programming. Its specific expression formula is as follows:

$$e^2 = f(2 - f). \quad (4)$$

In the development of the gymnasium path, it can be transformed by coordinates in the linear relationship

formula. Among them, the coordinate transformation function formula of gymnasium construction can be expressed as follows:

$$\begin{cases} X = (N + \text{alt})\cos(\text{lat})\cos(\text{lon}), \\ Y = (N + \text{alt})\cos(\text{lat})\sin(\text{lon}), \\ Z = \left(N(1-f)^2 + \text{alt}\right)\sin(\text{lat}). \end{cases} \quad (5)$$

The relative position refers to the point p in radian, and the coordinates in UTM system are known values in km, which is in the development path of the gymnasium. You can set the position of the gymnasium to p first and then calculate the longitude zone where the p point is located. The calculation formula can be expressed as follows:

$$\text{Zonenum} = \left[\frac{\text{lon}}{6}\right] + 1. \quad (6)$$

The preparatory work we need to do before carrying out the development path of stadium construction, we need to sort out the nodes in the development path of the gymnasium, then allocate resources before transmission, determine the relative position, then reasonably allocate the data in the development path, then match the nodes, and then match the data after matching the nodes, and then, we need to set the location of the gymnasium for follow-up work.

Z is the longitude zone where the gymnasium is located. The relative inclination angle of the link area where the gymnasium is located is

$$\text{lat}_0 = (\text{Zonenum} - 1) * 6 - 180 + 3. \quad (7)$$

When we calculate the relative position of the stadium development path, we need to make clear the efficiency between each node and where the bearing range is, so as to achieve the optimization of resource allocation, the tasks within the specified time after the resource allocation, and the relevant standards set to measure the work efficiency of the conversion between nodes.

Then, the transformation intermediate variable of the relative path of the arena is calculated, which must be related to the relative coefficient in the relative linear programming function that determines the position of the relative path of the arena. Therefore, the specific functional relationship can be expressed as follows:

$$v(\text{lat}) = \frac{1}{\sqrt{1 - e^2 \sin^2(\text{lat})}}. \quad (8)$$

Before we carry out the stadium development path, we need to calculate the transformation intermediate variables of the stadium relative path. Then, we need to transform the data system of relative path, change it according to the correlation of relative coefficients in the relative linear programming function, and then reduce the system path of transforming intermediate variable data according to the appropriate situation.

When calculating the relative path transformation of the gymnasium, the angle parameter must be considered.

Angle parameters also have a function transformation relationship. The function of angle parameters and the function transformation relationship can be expressed as follows:

$$S(\text{lat}) = \left(1 - \frac{e^2}{4} - \frac{3e^2}{64} - \frac{5e^6}{256}\right) \cdot \text{lat} - \left(\frac{3e^2}{8} + \frac{3e^4}{32}\right)\sin(2\text{lat}), \quad (9)$$

$$c = \frac{e^2}{1 - e^2}\cos^2(\text{lat}), \quad (10)$$

$$E = E_0 + k_0 a v\left(A + (1 - T + C)\frac{A^3}{6} + (5 - 18T + T^2)\frac{A^5}{120}\right). \quad (11)$$

Under environmental factors, our stadium construction and development path need to incorporate the angle parameters of specific reference objects. The change brought by the relative path change of the gymnasium will be a multi-angle change. According to the task needs, the task area should be selected, and then the central position should be analyzed to make a correct angle change choice, taking into account environmental factors and completing the construction path work at the same time.

The relative position of gymnasium construction and development path before transmission needs the path planning algorithm of the gymnasium to complete coordinate operation on a grid map, so it needs to be converted into UTM coordinates and then into map coordinate system. First, select the task area according to the task needs and then set one of the areas as the map origin; then the relative coordinates of any point are

$$N = N_0 + k_0 a v\left(s + v \tan \varphi\left(\frac{A^2}{2} + (5 - T + 9C + 4C^2)\frac{A^4}{24}\right)\right). \quad (12)$$

Because the path planning algorithm of the gymnasium needs to calculate the relative position coordinates on the grid map, it is necessary to transform latitude and longitude coordinates into UTM coordinates and then transform them into map coordinates to study the gymnasium construction path. First, select the task area according to the task needs and set one of the areas as the map origin p, and the map coordinates of any point are

$$p_E^{\text{map}} = E - E_{\text{origin}}, \quad (13)$$

$$p_N^{\text{map}} = E - E_{\text{origin}}. \quad (14)$$

3.2. Algorithm of Gymnasium Path Construction.

A wheeled odometer is installed in the gymnasium. By observing the positions of the left and right sides, the relative path of the current gymnasium construction can be calculated. Because the gymnasium is a mobile building structure, the left and right positions are inconsistent and the positions are predicted. Considering the complexity of the predicted position model, the template model is used to replace it

approximately. The angle value is expressed by the following formula, depending on the position of the template:

$$w = \frac{vr - vl}{2b}. \tag{15}$$

In order to obtain a stable and continuous heading angle estimation of the relative path of the gymnasium, based on the filter of the position model of the gymnasium template, the system state vector is $x = (\theta, \omega)^T$, and $w = \theta/d_t$ and θ can be observed, so the angular velocity calculated by the wheeled odometer is not observed, and only the angular velocity calculated by the wheeled odometer is used as the boundary constraint of the gymnasium engineering. The structural equation of the state of the system is as follows:

$$\begin{bmatrix} \theta_{k+1} \\ w_{k+1} \end{bmatrix} = \begin{bmatrix} J & \triangle t \times U \\ 0 & I \end{bmatrix} \begin{bmatrix} \theta_k \\ w_k \end{bmatrix} + u, \tag{16}$$

where θ_{k+1} and w_{k+1} are the route angle of $k + 1$ frame and the angle of gymnasium project, respectively, and DD is the control quantity, which is set as the observation position because other sensors cannot measure it. The system state and covariance are first initialized when the first frame data arrives. The initialization expression is as follows:

$$\begin{aligned} \theta &= \theta_0, \\ w &= 0. \end{aligned} \tag{17}$$

We need to arrange the path planning algorithm of the gymnasium before carrying out the development path of stadium construction; there is good control of the route angle of the design framework and the angle of the gymnasium project. In order to calculate the relative system path relative to the gymnasium later, we need formula (17) to initialize the system state and covariance when the first frame data arrives. If it is missing, it will lead to slow path disorder.

$$cov_a = \begin{bmatrix} 0.2 & 0 \\ 0 & 0.2 \end{bmatrix}. \tag{18}$$

According to the gymnasium construction model, the relative system path relative to the gymnasium can be calculated, and the relative path changes with time. Therefore, in order to study the relative path of the gymnasium, it is necessary to calculate the predicted value of the system state at the next moment. The calculation method of the predicted value is as follows:

$$\theta_{k+1} = \theta_k + wt, \tag{19}$$

$$w_{k+1} = wk. \tag{20}$$

The angle calculation of the gymnasium construction road path has true value and predicted value. We introduce covariance to predict the angle of the gymnasium path, so as to accurately estimate the angle between the true value and the gymnasium path. The covariance prediction value at the next time is as follows:

$$cov_{pre} = Fcov_k F^T, \tag{21}$$

where F is the position matrix of state transition gymnasium construction and d_t is the position spacing between two measurements, and the specific formula is

$$F = \begin{bmatrix} I & d_t \\ 0 & I \end{bmatrix}. \tag{22}$$

Waiting for the arrival of the next frame of data, the difference error between the previous gymnasium model route angle prediction value θ_{pre} and the actual gymnasium construction route angle observation value θ_{abs} is calculated, and finally, the best position estimation value and the worst predicted construction position estimation value are calculated. The best state estimation is as follows:

$$error = \theta_{obs} - \theta_{pre}. \tag{23}$$

The best position estimate and the best error estimate are calculated. The best position estimation needs to be verified after obtaining the best position model of $K + 1$ frame. Because the construction of the gymnasium needs to meet the proper planning, the pitch angle difference of $K + 1$ frame is not greater than $\Delta\theta_{max}$, that is, max is the maximum pitch angle difference between the two frames. The heading angle expression can be expressed as follows:

$$|\theta_{k+1} - \theta_k| \leq \Delta\theta_{max}, \tag{24}$$

where w_{max} is the maximum heading angle difference between two frames and d_t is the position interval between two frames. The data output frequency of the positioning system used in this paper is about 20 Hz, so d_t is used. The specific calculation method is as follows:

$$w_{max} = \min[w_{atr}, w_{odom}]. \tag{25}$$

In formula (25), according to the observation of the construction data of the left and right wheel positions of the wheel odometer, the construction position angle of specific facilities in the gymnasium and the best construction position that the gymnasium construction model can achieve are calculated. Locations are selected from the actual model built around the gymnasium. Black dots represent positions, and the multi-segment lines connecting positions do not match the actual positions. The placement satisfies the multi-path position constraint, and the system path position expression is as follows:

$$\begin{bmatrix} x_{k+1} \\ v_{k+1} \end{bmatrix} = \begin{bmatrix} I & \Delta t \times I \\ 0 & I \end{bmatrix} \begin{bmatrix} x_k \\ v_k \end{bmatrix} + u. \tag{26}$$

4. Related Operations of Gymnasium Construction and Development Path

4.1. Comparative Analysis of the Construction and Operation Modes of Stadiums and Gymnasiums. The operation modes of stadiums and gymnasiums include but are not limited to independent operation, cooperative operation, and

entrusted operation. Due to different resources and constraints, each operation mode has its own characteristics and limitations, but the goal is the same. All these can promote the management efficiency of stadiums and gymnasiums on the premise of ensuring social benefits, thus improving economic benefits. According to the census data, 93.7% of large stadiums and gymnasiums in Fujian Province adopt independent operation mode; 4.5% adopt entrusted operation mode; and only 1.8% adopt cooperative operation mode. It is found that Pearson Kay Square is 31.098a, $P = 0.000 < 0.05$, indicating that there is a significant correlation between the operation modes and types of large stadiums in Fujian Province. The absolute values of residual value adjustment of stadiums, swimming venues, and operation modes are 4.1, 2.1, 3.5, 5.4, 3.4, and 4.2, respectively, and they are not less than 1.96, indicating that the number of independent operations of stadiums and gymnasiums in Fujian Province is obviously higher than that of independent operation, and the proportion of cooperative operation and entrusted operation of swimming venues is more than that of cooperative operation and entrusted operation of stadiums and gymnasiums. However, there is no significant correlation between gymnasium and operation mode (the adjustment numbers of residual value are 1.2, 1.48, and 0.5, respectively, which are less than 1.96). Although there are differences in the operation modes of stadiums and gymnasiums in Fujian, on the whole, the ownership and operation rights of most stadiums and gymnasiums in Fujian are consistent. Sports venues and markets are not well integrated. In addition, the division of labor level is low, and the management concept and means are relatively lagging behind. Due to the excessive protection of the administrative system, the market lacks competitiveness. Among them, the gym performed well and the swimming pool performed relatively well. The operation modes and types of large stadiums and gymnasiums in Fujian Province are shown in Table 1.

These large stadiums and gymnasiums undertake various cultural and sports activities, and these subjects also suffer losses due to the increase in maintenance costs. In recent years, the state regulates the operation of stadiums and gymnasiums, but their profitability has not been strong. According to the census data, the proportion of loss-making stadiums and gymnasiums is 6.77%; the proportion of profit-making stadiums and gymnasiums is 23.3%; and the proportion of flat-operating stadiums and gymnasiums is 70.0%. Some venues lost 6.1 million yuan, while others brought in more than 1 million yuan in income a year. Chi-square test of a contingency table is used to test the management effect and operation effect of large stadiums and gymnasiums: Pearson's chi-square is 20.774a, $P = 0.000 < 0.05$, which shows that the management mode of large stadiums and gymnasiums in Fujian Province is significantly related to the management situation. The absolute values of surplus, balance, and operation mode adjustment surplus are 4.4, 2.7, 3.4, 4.1, 2.0, and 3.5, respectively, indicating that the number of cooperative operation and entrusted operation of surplus-scale stadiums is significantly higher than that of independent operation,

and the proportion of independent operation of flat-scale stadiums is significantly higher than that of cooperative operation and entrusted operation. However, there is no obvious difference between venues with loss scale and operation mode (the absolute value of adjusted surplus is 0.0, 0.8, and 0.6 < 1.96), which shows that the profit and loss of large venues are closely related to operation, management authority distribution, and asset structure. See Table 2 for the operation mode and profit rate of large venues in Fujian Province:

With the steady development of China's social economy and the continuous improvement of people's demand for sports, Fujian makes full use of its location advantages to carrying out colorful sports activities. According to the census data, there are 2,381 employees in 443 stadiums and gymnasiums in Fujian Province, with a total opening hour of 76,998 days. The income of large and small stadiums and gymnasiums includes financial allocation, extra budgetary funds of administrative units, subsidy income of higher authorities, business income of public institutions, income turned over by subordinate units and other income, and operating income and nonoperating income of stadiums and gymnasiums. The total investment in the project is 597.014 million yuan. The expenses paid by sports facilities of all scales (including supporting houses) totaled 585.799 million yuan, and the total profit was 11.215 million yuan. Among them, the number of employees and annual opening days of swimming pools ranks first, while the stadium has the highest total revenue and expenditure due to its large scale. From the perspective of single-scale stadiums and gymnasiums, the average number of employees in single-scale stadiums and gymnasiums in Fujian Province is 5, one less than the national average. The average annual open day is 174 days, which is 7 days more than the national average; the per capita income is 1.348 million yuan, which is 765,000 yuan higher than the national average; and the average expenditure on educational facilities is 132,200 yuan, which is 734,000 yuan higher than the national average. Among them, the average annual income of employees is 251,000 yuan, which is 153,000 yuan higher than the national average; the average profit is 5,000 yuan, which is 6,000 yuan higher than the national average. It can be seen that the operating cost of large stadiums in Fujian Province is higher than the national average. They generally bring benefits, but due to the low-performance index, the profitability is often limited, as shown in Table 3.

4.2. Deterministic Technical Analysis of the Development Path of Gymnasium Construction. The construction of large-scale stadiums and gymnasiums is going on. In order to put forward a constructive solution for the transmission of stadiums and gymnasiums development path, the processing of the secondary path construction path of each stadium and gymnasium can effectively reduce the packet loss in the construction path and ensure the reliability of the construction path while ensuring the certainty of transmission. Therefore, this paper mainly explores the deterministic multi-path-related technology of gymnasium path

TABLE 1: Operation modes and types of large-scale stadiums in Fujian Province.

	Type	Independent operation	Cooperative operation	Entrusted operation	Total
Scale stadium	Total	212	1	2	215
	Percentage	51.1%	12.5%	10.0%	48.5%
	Adjustment of residual value	4.1	−2.1	−3.5	
Gymnasium	Total	83	0	3	86
	Percentage	20.0%	0.0%	15.0%	19.4%
	Adjustment of residual value	1.2	−1.4	−0.5	
Natatorium	Total	120	7	15	142
	Percentage	28.9%	87.5%	75.0%	32.1%
	Adjustment of residual value	−5.4	3.4	4.2	
Total	Total	415	8	20	443
	Percentage	100.0%	100.0%	100.0%	100.0%

TABLE 2: Operation mode and profit rate of scale sports venues in Fujian province.

	Type	Profit	Balance	Deficit	Total
Independent operation	Total	87	300	28	415
	Percentage	84.5%	96.8%	93.3%	93.7%
	Adjustment of residual value	−4.4	4.1	0.0	
Cooperative operation	Total	5	3	0	8
	Percentage	4.9%	1.0%	0.0%	1.8%
	Adjustment of residual value	2.7	−2.0	−0.8	
Entrusted cooperation	Total	11	7	2	20
	Percentage	10.7%	2.3%	6.7%	4.5%
	Adjustment of residual value	3.4	−3.5	0.6	
Total	Total	103	310	30	443
	Percentage	100.0%	100.0%	100.0%	100.0%

TABLE 3: The operation comparison between Fujian and China.

Type		Employees		Opening days in a year		Total income (thousand yuan)		Total expenditure (thousand yuan)	
Fujian	Sports ground	541	3	34,746	162	460,312	2,141	458,581	2,133
	Stadium	439	5	13,028	151	36,680	427	39,168	455
	Natatorium	1,401	10	29,224	206	100,022	704	88,050	620
	Diving hall	0	0	0	0	0	0	0	0
	Total	2381	5	76,998	174	597,014	1,348	585,799	1,322
China	Sports ground	18,950	3	780,541	138	2,160,965	381	2,081,736	367
	Stadium	18,853	6	528,101	173	2,010,931	658	2,586,091	847
	Natatorium	32,937	10	672,477	212	2,705,021	855	2,266,820	716
	Diving hall	336	11	3,043	101	68,884	2,296	69,024	2,301
	Total	71,076	6	1,984,162	167	6,945,801	583	7,003,671	588

construction from two aspects: related protocols and path transmission. Transmission protocol provides multiple transmission paths with delay guarantee for deterministic multi-path transmission, and path transmission guarantee provides accurate multi-path scheme according to construction requirements and carries out the deterministic transmission on construction paths. Explore the path technology of gymnasium construction, This paper mainly summarizes the clear transmission and display methods of sports construction development path from two aspects of topological path and path algorithm, This paper summarizes the existing multi-path algorithms, which provides theoretical guidance for the construction of the transmission multi-path algorithm of the development path of sports construction, and provides a reference for the design of packet scheduling mechanism and multi-path transmission protocol. Figure 1 shows its contents:

The traditional path uses the transmission resources of the gymnasium path to reserve time slots. Under the scheduling strategy of resource reservation + time slot + managed TEG algorithm, path packet loss often occurs in the transmission process. The performance of various transmission strategies of gymnasium construction paths is compared, which ensures the reliability of data packets. TEC experiment simulates data packets with less time period and generates uniformly distributed arbitrary
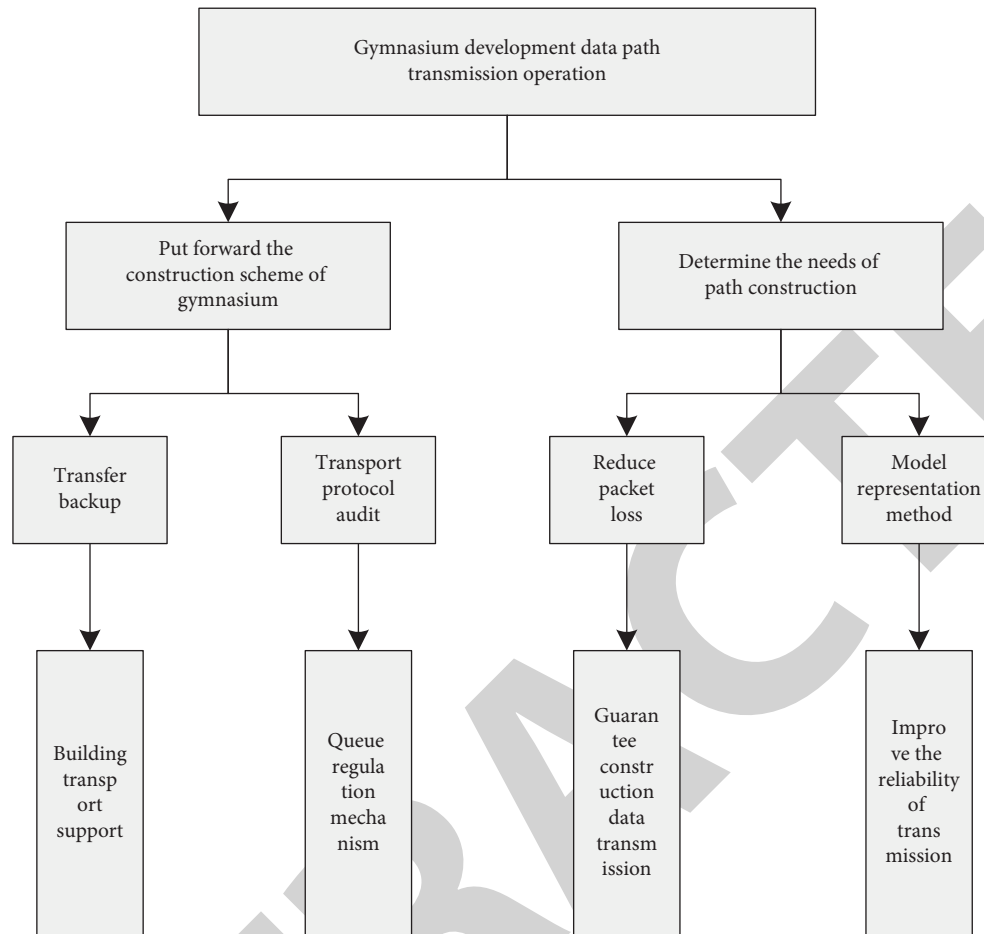
Figure 1: Communication operation of gymnasium construction and development path.

paths, which can meet the requirements of service delay. The link width of the simulation path is 50 Gbps, and the length of the time slot is 8 ms. After the TEG model is established, the sending queue data of the managed gymnasium path is set to 8, and the data packets generated successively are numbered and sent, simulating the sending process of the data packets in each node and recording the data points where the data packets sent by each gymnasium arrive at each node. When a packet arrives at the same node at the same time, it is regarded as packet loss. According to this, the reliability and guarantee performance of various transmission strategies for sports engineering path data packet transmission under different network loads are counted. The transmission error rate by scheduling condition is shown in Figure 2.

Because before scheduling the resources in the development path of sports construction, we must first make a concrete analysis of reserving time slots for transmission resources. In order to reduce the occurrence of packet loss and improve the performance of the gymnasium construction path transmission strategy, the link width of the simulation path is not the same, and the quality and size of the data sent in the queue are also different under different network loads, so the gap may be obvious.

Considering the ecological environment constraints, we set different QS parameters, which restrict the success rate of the Q-TEG algorithm in selecting and arranging the development path of sports construction. This simulation experiment explores the influence of different QS parameters on the performance of the Q-TEG algorithm. For each link of the shown gymnasium building path topology, a small random error rate is set in addition to the basic path propagation delay bandwidth parameter. The propagation parameters of the development path of sports construction are fixed values, which are calculated according to distance. The Q-TEG model is constructed with the time slot length $t = 8$ ms, the number of node queues needs to be recorded, and the capacity of each queue matches the capacity of links when the propagation movement constructs the development path. According to the propagation experiment of the simulation test, the packet loss threshold is randomly set at the beginning node and the end node of the development path of gymnasium construction. Whether the development path transmission of gymnasium construction is successful and whether the upper limit of delay, the upper limit of path jitter, the upper limit of loss of inclusion, and service arrangement are successful, the transmission compliance rate of development paths in different directions is shown in Figure 3.
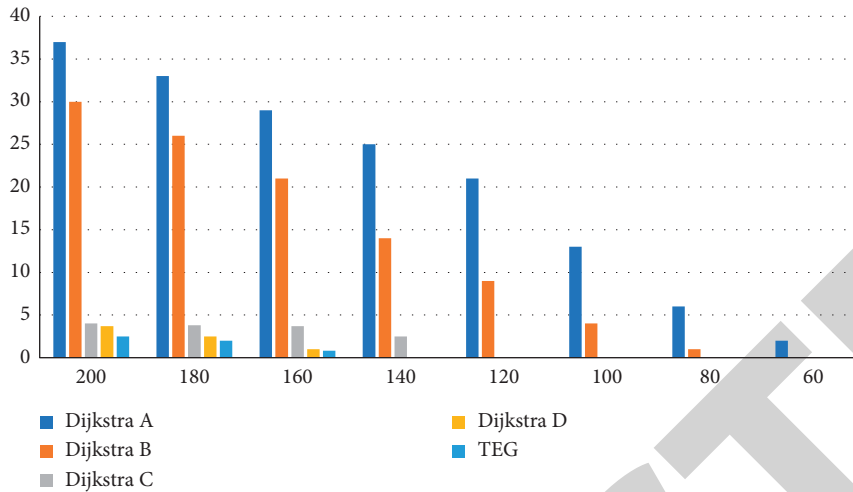
FIGURE 2: Comparison of error rates under different scheduling conditions.
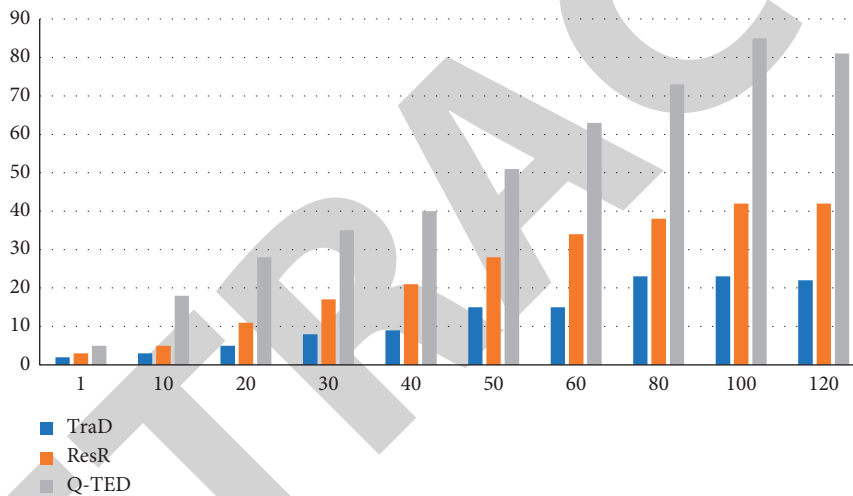
FIGURE 3: Completion rate of gymnasium construction and development path in different directions.

4.3. Breakthrough of Restrictive Factors in the Path of Sports Development and Construction. From the above simulation results, it can be seen that the Q-TEG algorithm, compared with the traditional Dtra algorithm and the Dtra algorithm supporting resource reservation, has certain limitations on the scheduling completion rate of gymnasium construction path development. The link bandwidth of the sports construction development path has a great influence on transmission, and sports construction development has a great influence on the completion rate through single- or multi-channel scheduling. Under the condition of sufficient link bandwidth, due to time constraints, fluctuation constraints, and packet loss constraints, the propagation layout of the sports construction development path cannot be completed. Packet loss rate rarely occurs in multi-path, which proves that multi-path is more efficient in controlling the development path of sports construction and controls packet loss in a very small range. Because the jitter of any path of Q-TEG is fixed at 2 in different variation intervals, when the variation threshold is relaxed, the varying path

time difference and path intrinsically become relaxed for a single path to multi-path. The slot length of the Q-TEG model and the multi-path delay difference of the Q-TEG model in multi-path configuration can bring better performance to the algorithm. The comparison of sports construction development paths under different change thresholds is shown in Figure 4.

The propagation parameters of the path are fixed when the development path of stadium construction is carried out, and the capacity of the queue matches the capacity of the link when the propagation movement constructs the development path so that the ecological environment constraints can be taken into account and the random error rate of the path can be reduced. Multi-path has higher controllable efficiency for the development path of sports construction, and the performance of the derived protection mechanism and single-route retransmission guarantee mechanism is also guaranteed, which is more conducive to the work.

In order to break through the limitation of timeliness, this paper compares the performance of multi-path sports
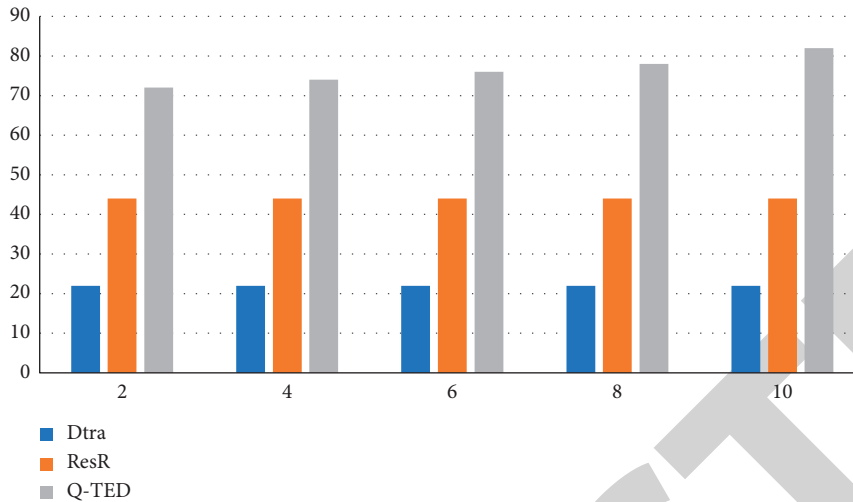
FIGURE 4: Breakthrough completion of sports construction development path under different fluctuation thresholds.

construction routing service protection mechanism and single-route retransmission guarantee mechanism in timeliness deterministic transmission network and analyzes the performance of the two mechanisms in effective timeliness. The invalid transmission rate of data packets refers to the ratio of the lost data packets and the total number of transmitted data packets in the transmission process of the sports construction development path. In order to prevent packet loss, it is necessary to analyze the formation of problems and constraints. However, we believe that the lower the packet loss rate, the better. We compare the transmission efficiency and constraint breakthrough probability under different algorithms, as shown in Table 4.

In the process of developing a mobile engineering path, the original data of path vertices without path base points in these single paths are processed and deleted, and the shortest path index with other vertices is made for each vertex with remaining simplified data. Before constructing the processing strategy, calculate the priority of each vertex in the development path of sports construction, take the priority of vertex as the processing order of index construction, and query the constructed index at the same time of index construction. If the result of searching for the shortest path of an update object vertex from the constructed index is greater than the shortest path index of the constructed object, the index of the update object vertex is ignored. When the shortest path index is smaller than the shortest path index that should be constructed among the constructed shortest path indexes, the shortest path index of the updated vertex is maintained. Retrieval association constraints depend on the development path data constructed by the index. Comparative analysis of the construction effects of transmission on different paths can be seen in Table 5.

4.4. Strengthening the Path of Construction and Development under Environmental Factors. The method of strengthening the development path of venue construction requires establishing a model according to the environmental impact,

considering the relationship with environmental factors when facing complex problems, and calculating, storing, and reusing the solutions of each subproblem. In consideration of environmental factors on the basis of current situation analysis, first initialize the path data of gymnasium construction, convenient for later path analysis. The optimal strategy is adopted to enhance the transmission state of the simulation path and make it interact with the environment all the time. After deciding to implement, according to the implementation effect, analyze how to optimize the governance under environmental factors and finally achieve the goal. The current construction work needs to collect or build data in advance and set the development path under environmental factors according to the existing static data. Enhanced path data generation and model optimization are combined in an interactive way, and the optimization process is fed back to the network model for repeated optimization processing, so it is suitable for the early planning of gymnasium construction path development. In the preliminary analysis, combined with the influence of environmental factors, the following work can be done, as shown in Figure 5.

In the process of optimizing the development path of gymnasium construction, we need to feedback on the network model and carry out repeated optimization processing, The later path analysis needs to be established within the fluctuation range of the simulation path, which is convenient for the subsequent interactive operation of the environment. Analyze the environmental factors and set the development path under the environmental factors according to the existing static data and then choose the suitable preplanning of the gymnasium construction path development.

Through the above combined with the current environmental factors to deal with the development path, we found the best path for the initial node and the end node of the development path in the process of gymnasium construction. Because nonoverlapping paths between nodes must be calculated, paths cannot contain loops, and there cannot be overlapping nodes between different paths.

TABLE 4: The transmission efficiency and the probability of breaking through the limiting factors under different algorithms are compared.

	Propagation efficiency of single path	Multipath propagation efficiency	Limiting factor resolution rate
Dtra	0.845	0.356	0.18
ResR	0.956	0.548	0.26
Q-TED	0.984	0.628	0.34

TABLE 5: Comparative analysis of index propagation effect on different paths.

Index set	PLL	IS-ABLE	SHP	CP
Xmark	109	151	121	121
Vchocyc	221	278	198	187
Amaze	56	89	78	84
Anthra	241	324	256	202
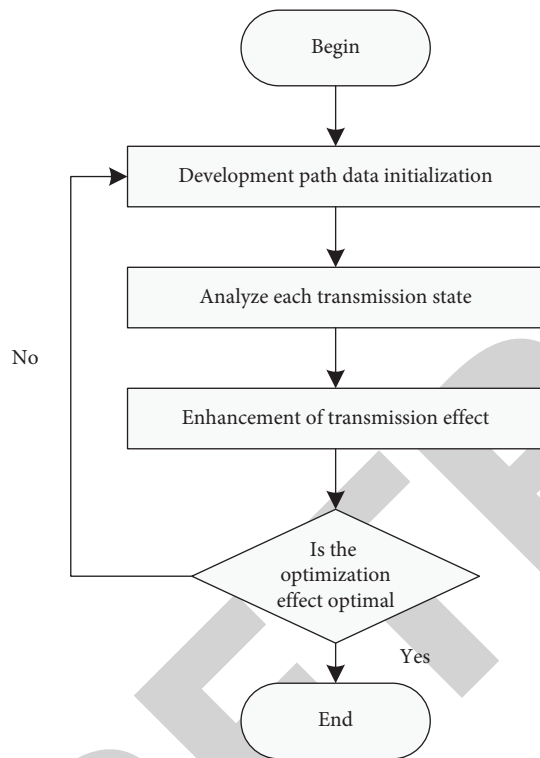
FIGURE 5: Strengthening process of stadium construction and development path.

Different algorithms are used to analyze and compare the operations under different path intervals. After each search, the nodes on the path will be isolated. Cut off all edges of nodes on the path, transform them into isolated nodes, and generate a new network graph. This is the number of nonrepeated paths between nodes. Using the concept of optimal path and node separation in the search process can ensure the actual requirements of paths and make up for the shortcomings of repeated path nodes. Figure 6 below shows the behavior comparison:

When the path processing effect used in the stadium development path is not good, We need to find out the number of nonrepeated paths between nodes and then deal with the development path according to the current environmental factors, cut off all edges of nodes on the path, isolate unavailable nodes, and finally ensure the actual requirements of the path.

Considering the time consumption of path numbers caused by environmental factors, the time consumption of the nonrepeated path algorithm and BFS technique is adopted. Based on the matrix power path algorithm and acyclic path algorithm, the development mode of gymnasium construction under the influence of environmental factors is optimized, considering that the required time is similar to the above. Based on the principle of the optimization method, this paper analyzes the limitation of environmental factors on the development path of gymnasium construction. Considering that in the process of calculating the path without a loop, the intermediate matrix is obtained by multiplying the number of paths in the previous layer with the adjacent matrix every time and then new expansion nodes are added to lead to the circular path, the corresponding number is eliminated from the intermediate matrix. The results of analyzing the power of the matrix show that the number of paths between nodes in the network can be obtained from the K power of the matrix. In the calculation of the number of paths, because both algorithms use a large number of matrix multiplication operations, there is a similar time. The acyclic path is based on the power of the matrix, plus the acyclic operation, so the final result is more accurate than the power multiplication of the matrix. The width-first search method takes the most time. According to the method analysis, after determining one path, delete the corresponding build path node. The width-first search method takes the longest time because it requires repeated searches in the network. In this algorithm, based on the starting point node and the end point node of the path, the best path is selected as the subpath for connection. Multiple iterations are avoided when finding nodes. According to the limitations of different environmental factors, the efficiency comparison results of the selected methods on the path are shown in Figure 7.

Compared with the traditional treatment of gymnasium construction and development path under environmental factors, it is necessary to clearly understand the number of nonrepetitive path calculations. It can be seen that with the increase of node scale based on the construction path, we need to deal with the analysis data received in real time
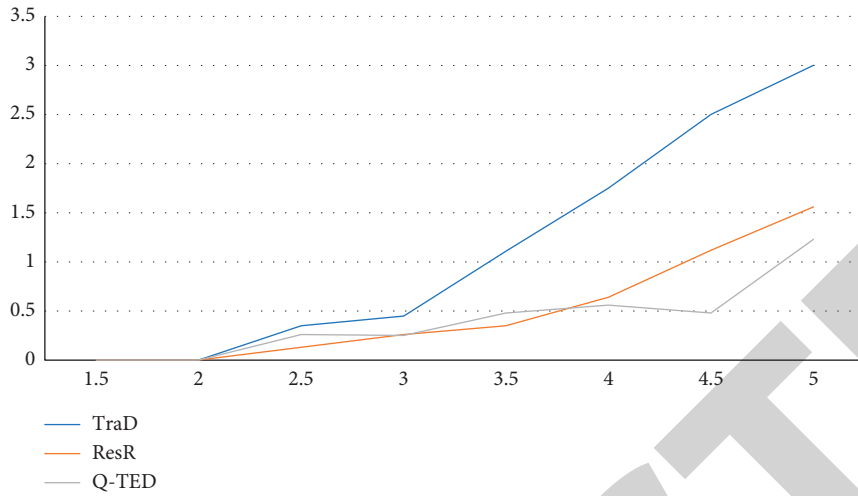
Figure 6: Comparison of optimization effects of different algorithm development paths.
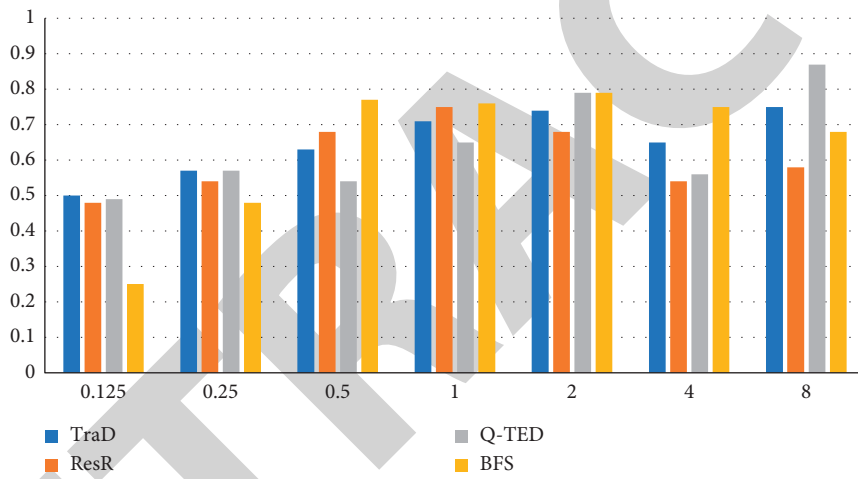
Figure 7: Efficiency comparison results of path methods.
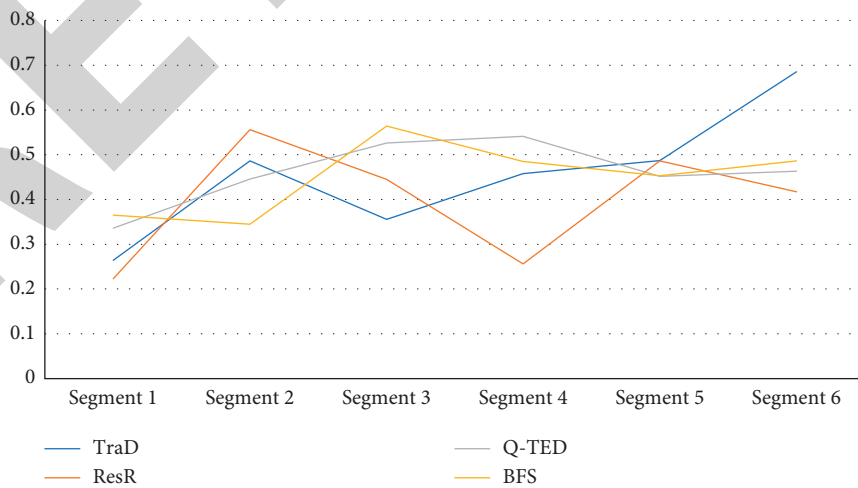
Figure 8: Comparison of algorithm repeated path elimination efficiency in different path segments.

Research Article

Management Cost Management and Resource Optimization of Construction Enterprises Based on Ecological Environment Constraints

Yan Xing and **Quanying Xin**

College of Urban Construction, Hebei Normal University of Science and Technology, Qinhuangdao 066004, China

Correspondence should be addressed to Yan Xing; xingyan2756@hevttc.edu.cn

In recent years, with the proposal of the "One Belt, One Road" initiative, the domestic economy and its development have entered a new normal, which has promoted the determination and connection of the development strategies of various countries. It has brought new opportunities for the development of domestic enterprises. In this context, it has become a trend for Chinese enterprises to go international, especially in the construction industry; due to the good potential of the "Belt and Road" initiative, it is necessary to change and update from the traditional construction industry to modern construction industry. Therefore, how to promote the coordinated development of the construction company's resource management system, meet the needs of the company's own development, and adapt to the goals of internationalization and modern management have become a problem that people are very concerned about. The current domestic environmental situation is improving in part, but it is deteriorating in general. The harm caused by environmental pollution and damage is becoming more and more obvious. The construction industry is one of the national pillar industries, and it is also an industry with high energy consumption and high pollution. Based on this, this study first introduces construction enterprise management and resource optimization methods and integrates ecological environmental protection into enterprise operating cost management. Second, it establishes an enterprise-centric resource allocation model and optimization algorithm. An empirical study was carried out on the ecological management capabilities of three construction enterprises of different sizes, namely, Industrial Group, Group A, and Construction Enterprise B, and concluded that the overall level of environmental competitiveness of construction enterprises in my country is not high, among the environmental management and construction capabilities of enterprises. The standardization ability of ecological engineering construction is relatively weak, resulting in poor overall profitability of the enterprise, and the number of green suppliers does not meet the needs of ecological development. However, under the constraints of the ecological environment, construction enterprises compete with each other to control operating costs and at the same time affect the environment. At the same time, the allocation of resources by enterprises is also more conducive to the development of ecological civilization in the industry.

1. Introduction

The dry land in western China refers to the vast area west of the Helan Mountains and north of the Kunlun Mountains. Studying and improving the ecological environment of the arid areas in this area are of great importance for the implementation of national strategies and policies to accelerate the development of the region and for maintaining social order and national territorial integrity [1]. The rise of nontectonic movement and climate warming and drying leads to the deterioration of ecological environment and the degradation of swamps. In addition, frequent human activities, including deforestation, draining swamps, exploiting peat, and overgrazing, make this possibility come true [2]. The combination of ecological vulnerability and agricultural activities in the loess hilly and gully region of western China

has attracted extensive environmental concerns. The changes of soil moisture and fertilizer content at different depths in sloping farmland and terraced fields on the Loess Plateau were studied, and the ecological impact and economic benefits of terraced fields were evaluated [3]. Land consolidation is the reconstruction of the ecological environment system that affects regional environmental factors and ecological processes. There are three factors that affect the regional ecological environment in the process of land consolidation including the characteristics of land consolidation engineering, changes in land use types, and landscape pattern changes after land consolidation [4]. The level of marine environmental management is the key factor for the successful implementation of the strategy of marine power, and the improvement of the level of marine environmental management requires innovation in marine management. In other words, in order to realize the sustainable development of the marine economy, we must realize the transition from marine environmental management to marine ecological environment management [5]. In the construction industry, corporate social responsibility (CSR) is increasingly seen as a factor in promoting sustainable business operations. Based on stakeholder theory, CSR performance issues with different stakeholders are proposed to demonstrate the key factors of CSR performance in construction, and then indicators that reveal the content of performance issues are selected [6]. There are several possible paths of development for construction companies as they strive to grow. It has been found that most local contractors have grown up by working from home, either as a main contractor or as a specialist subcontractor, with advice on appropriate growth paths for Singaporean contractors in different contexts [7]. This paper proposes a method to determine the management strategy of construction enterprises. To this end, a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis is recommended as a tool for developing a management strategy. Best practices in this regard are also analyzed. The algorithm is based on AHP, expert judgment, and feasible solution ranking method to select the optimal strategy [8]. In order to improve the performance of the construction industry, this paper analyzes the key factors that affect the effectiveness of organizational communication in construction enterprises and discusses the correlation between the effectiveness of organizational communication and alliance performance [9]. The construction industry is an important source of direct employment and, through its wide range of operations and projects, contributes to the growth and development of virtually every other sector of the economy. It is only from a pool of resourceful, well-trained, and motivated small contractors that well-founded mid-sized and larger local companies can gradually grow and grow [10]. The article explores how firms implement cross-organizational cost management in the product design process and the characteristics of the relational environment associated with it; it also discusses the impact of this development on making or purchase decisions [11], focusing on activity-based cost management (ABCM), which can provide better information for strategic decision-making in product planning and cost management, which is beneficial to the development and management of construction enterprises [12]. The cost of a relationship depends not only on the internal factors of both parties, but also on the level of focus with other relationships, so the way in which other parties (such as the supplier's other customers, the customer's other suppliers, and the customer's customers) affect the cost needs to be included in the under analysis [13]. We propose an autonomic computing approach to the problem of reconfiguration, enabling a service-based system to configure itself through a loop of monitoring, analyzing, planning, and executing actions [14]. Optima is a software package for epidemiological and intervention modeling that we developed to address practical policy and program problems encountered by funders, governments, health planners, and program implementers. Optima's key features are its the ability of performing resource optimization to meet strategic objectives, including associated financial commitment projections and health economic assessments [15].

2. Construction Enterprise Management and Resource Optimization Methods

2.1. Status Quo of the Development of Domestic Construction Enterprises. In recent years, the situation of the domestic construction market has become more and more severe. From the global economic trend to the implementation of the government's new "National Five Regulations," the current situation shows that the severe winter of the construction industry is coming again. The big environment is like this, the small environment is even less optimistic and it is difficult for ordinary local construction companies to maintain. Due to the low barriers to entry in the construction industry, nonlocal companies, small companies, partnerships, and even rural construction teams have begun to occupy certain markets, while local construction companies can only survive in the cracks; that is, they need to compete with large companies for financial resources and small units, price and the ability to compete with companies of the same size. In a word, in this case, it is not enough to only rely on financial resources, price, and interpersonal relationships to occupy the market and gain a certain market share; only well-run companies and project departments can have and manage absolute competitive advantages. In addition, project bids are more standardized, and checklist bids make project bids very transparent, making it more difficult to add costs and change the way in which costs go through standardized project management or design reviews. At the same time, in the context of such fierce competition, many construction companies continue to adopt a broad management model, and, in the long run, the company will fall apart. Therefore, enterprises and project departments must rely on advanced and efficient management models, low cost, and strict resource allocation in order to gain a firm foothold in the market and find a way to success.

2.2. Current Situation of Development of Foreign Construction Enterprises.
A vast majority of construction companies in the United States, Japan, Britain, France, and other countries are statutory private companies with very few government shares and flexible labor systems. The workforce is mainly composed of contract agents or temporary workers, which are low-cost and flexible operating organizations. Internationally renowned construction companies can provide full-process management services in their engineering fields, limited not only to traditional construction contracts, but also to predesign, engineering, procurement, construction, commissioning, and operation services. According to the actual needs of the project, the company has the financial strength and advance payment ability. The company protects its long-term organizational interests through the industries that it serves, and, at the same time, it brings more added value to the organization by expanding its service areas.

2.3. Ecological Environment Theory.
According to Article 26 of the Constitution, the state protects and improves the ecological environment of residential areas and prevents environmental pollution and other hazards. In 2005, some academicians proposed the fact that the concept of "building an ecological environment" should be gradually revised. It can be said that the ecological environment is the environment, environmental issues such as pollution must be included, and they are inseparable. Some experts believe that the ecological environment should be defined as a more compatible ecological environment without major problems and other pollution, which can be understood as the sum of the material conditions for human survival and development.

2.3.1. Human Resource Niche Theory.
The precise content of the concept of human resource niche refers to the interaction and interdependence of organisms and their lives, as well as the environmental protection function of each other's systems. The interdependent human resources and environment objectively demonstrate the movement of all data flow transformations. Referring to and further refining the concept of HR niche in empirical research on companies, we first discuss HR management systems and further define the concept of HR niche: the precise location of an individual (or group) in a specific environment. In addition to the fact that it mainly expresses personal development and viability, it also contains other environmental factors.

2.3.2. The Path to Optimize the Human Resources Ecological Environment of Construction Enterprises.
Use the design hypothesis model to extensively analyze human resources, evaluate the internal relationship of environmental and environmental factors, build the company's human resources ecological evaluation system, conduct a comprehensive evaluation of the ecological environment of the construction enterprise, combine the evaluation specific practice, and set optimization measures to achieve the expected research goals.

2.4. Enterprise Resource Optimization Methods.
There are many research methods on the balanced allocation of corporate resources at home and abroad:

(1) Manual method: this method is intuitively realized from the network diagram of the project on the basis of the CPM method, also known as the graphical method, but this method has obvious shortcomings and is only suitable for simple network diagrams. The scale of the project increases, the amount of calculation and the difficulty increases greatly, and the optimization cannot be achieved by artificial methods. Although this method produces a balanced solution with a smaller grid size, it is difficult to achieve the optimal guarantee.

(2) Mathematical programming method: in theory, no matter how complex the network graph is, the resource balance problem can always be determined by mathematical methods and then solved by existing linear programming methods. However, when there are too many programs in a project, and the relationships between them are complex, there are too many variables and constraint equations related to the problem, and the feasibility becomes poor.

(3) Heuristic method: with the deepening of the research and application of intelligent algorithms, many researchers use this idea to solve the problem of resource balance, such as tabu search algorithm and simulated luminescence algorithm. These methods are algorithms for finding the solution space according to certain rules. This method has a fast convergence speed and can quickly obtain the optimal solution.

3. Enterprise Center Resource Allocation Model and Optimization Algorithm

3.1. Convex Optimization Theory.
In convex optimization research, the minimization problem of convex function defined by convex set is an important part of mathematical optimization research, and the most common problem form is mainly linear programming problem. In general, convex optimization problems have the following form:

$$
\begin{aligned}
&\min f_0(x),\\
&\text{subject to } f_i(x) \le b_i, \quad i = 1, \ldots, m \\
&a_i^T = b_i, \quad i = 1, \ldots, p.
\end{aligned}
\tag{1}
$$

Among them, the function is a convex function, the convex optimization problem must satisfy the inequality constraint function that must be a convex function, and the equality constraint function $h_i(x) = a_i^T - b_i$ must be an affine function.

3.2. Lagrangian Dual Function. Consider an optimization problem of the following standard form:

$$
\begin{aligned}
&\min f_0(x), \\
&\text{subject to } f_i(x) \le 0, \quad i = 1, \ldots, m \\
&\qquad h_i(x) = 0, \quad i = 1, \ldots, p.
\end{aligned}
\tag{2}
$$

The basic idea of Lagrangian duality is to emphasize the limitation of formula (2) and add it to the objective function to obtain the optimal function. The above optimization problem can be expressed in the following form:

$$
L(x, \lambda, \nu) = f_0(x) + \sum_{i=1}^{m} \lambda_i f_i(x) + \sum_{i=1}^{p} \nu_i h_i(x),
\tag{3}
$$

where the vectors λ and ν are called binary variables or Lagrange multiplier vectors of formula (2). Define Lagrangian dual function:

$$
g(\lambda, \nu) = \min_{x \in s} L(x, \lambda, \nu).
\tag{4}
$$

If a Lagrangian function has no lower bound on x, its double-precision function has the value $-\infty$. For any set (λ, ν), the Lagrangian bifunction forms a lower bound on the maxima of the optimization problem as follows:

$$
g(\lambda, \nu) \le p^*.
\tag{5}
$$

The Lagrangian double function can be expressed as the following optimization problem:

$$
\begin{aligned}
&\max g(\lambda, \nu), \\
&\text{subject to } \lambda \ge 0.
\end{aligned}
\tag{6}
$$

The set (λ, ν) that satisfies the conditions is called a feasible solution, and the solution obtained after the objective function of equation (6) reaches the maximum value is the optimal solution of the dual problem, which can be expressed as (λ^*, ν^*).

Regardless of whether the original problem is a convex optimization problem, the double Lagrangian function is a convex optimization problem. In an optimization problem, when the constraints are difficult to solve for the optimal value of the optimization problem, it can be solved neatly.

3.3. Construction of the Central Resource Allocation Model. The purpose of allocating resources is to use the resources of an appropriate amount of physical machines as efficiently as possible. For this reason, the following optimal resource allocation models for cloud virtual server centers are constructed:

$$
\max \sum_{s \in s} U_s(y_s) \text{subject to } \sum_{r \in R(s)} \sum_{p \in p(s)} x_{sr}^p = y_s, s \in S,
\tag{7}
$$

$$
\text{over } x_{sr}^{\min} \le x_{sr}^p \le x_{sr}^{\max}, r \in R, s \in S, p \in P.
\tag{8}
$$

For the fairness of virtual machine resource allocation in the enterprise private cloud, selecting the appropriate tool

may result in the corresponding resource allocation. Consider the following useful functions:

$$
U_s(y_s) = W_s \log y_s.
\tag{9}
$$

Among them, W_s is the voluntary payment of cloud users in the enterprise in order to obtain the corresponding resource allocation when configuring parameters.

3.3.1. Model Analysis. For the resource allocation model (7) and its utility function (9) proposed in this paper, the objective function is strict for y_s; although x_{sr}^p is not a strictly convex function, under linear constraints, the convex set is an allocation of resource-constrained optimal sets. The following results can be obtained from the convex optimization theory. In order to obtain the optimal solution of the enterprise resource allocation model, the Lagrangian function is introduced.

$$
L(x, y, \lambda, \mu) = \sum_{s \in S} (U_s(y_s) - \lambda_s y_s) + \sum_{pr} \sum_{s} x_{sr}^p ((\lambda - \mu_p) + C_p).
\tag{10}
$$

Among them, $\lambda = (\lambda_s, s \in S)$ is the payment that enterprise cloud users pay for each unit of computing resources. Price $\mu = (\mu_p, p \in P)$ is the fee charged per unit of PM computing resources in

$$
S_s(\lambda_s) = \max U_s(y) - \lambda_s y_s,
\tag{11}
$$

$$
P_{ps}(\lambda_s, \mu_p) = \max x_{sr}^p(\lambda - \mu).
\tag{12}
$$

In (11), enterprise cloud users attempt to maximize value based on the total resources obtained depending on their role in deploying the application cloud. In (12), the application component extracts the resource configuration value x_{sr}^p from the physical machine. Since physical machines offer a price per resource unit, the cost value of resource value is allocated to physical machines, so (12) shows that PM maximizes its own benefit; the following is a duplicate of how to solve the virtual machine resource allocation problem:

$$
\begin{aligned}
&\min D(\lambda, \mu), \\
&\text{subject to } \lambda_s \ge 0, \mu_p \ge 0.
\end{aligned}
\tag{13}
$$

Problem (7) is to maximize the overall efficiency of cloud applications under the limited PM resources of the enterprise cloud service center, while problem (13) is to minimize the total cost of cloud services. When deploying applications in the cloud, in order to obtain the optimal allocation of virtual machine resources, whether it is the optimal solution of the original problem or the repeated problem, we get

$$
y_s^* = \frac{W_s}{\lambda_s}.
\tag{14}
$$

It can be seen that the total resource configuration value obtained by the VM where each application is located is unchanged. In addition, according to the different resource configuration requirements of enterprise cloud service users,

other types of auxiliary functions can be selected to realize different types of auxiliary functions to resource allocation goals.

3.4. Central Resource Allocation Algorithm.

To understand whether the virtual machine where each application's components are located can perform resource optimal allocation when enterprise cloud users deploy applications in the cloud, this paper proposes the following enterprise resource allocation algorithm:

$$\frac{d}{dt}x_{sr}^{p}(t) = \theta x_{sr}^{p}t(\lambda_s) - \varepsilon(t), \tag{15}$$

$$\varepsilon(t) = \frac{\sum_{j \in s(p)}\sum_{i \in R(j)}x_{ji}^{p}(t)\lambda_j(t)}{C_p}. \tag{16}$$

The process-specific prices that corporate cloud users pay for deploying cloud applications are

$$\lambda_s(t) = \frac{W_s}{\max\{\eta, y_s(t)\}}, \tag{17}$$

$$y_s(t) = \min\left\{y_s^{\max}, \max\left(\sum_{rp}x_{sr}^{p}(t), y_s^{\min}\right)\right\}. \tag{18}$$

In the above algorithm, the expected price of the physical machine can be regarded as the supply of resources, and the expected price of the physical machine at the equilibrium point is equal to the price actually paid by the user.

3.4.1. Resource Allocation Algorithm.

When considering this function tool, the following enterprise resource allocation algorithm is recommended to achieve optimal resource allocation for each enterprise encapsulating the application when the enterprise cloud user deploys the application in the cloud:

$$\frac{d}{dt}x_{sr}^{p}(t) = \theta x(t)\left(\lambda_s t - \varepsilon_{pt}\right), \tag{19}$$

$$\varepsilon_p(t) = \frac{\sum_{ji}x_{ji}^{p}(t)\lambda_j(t)}{C_p}, \tag{20}$$

$$\lambda_s(t) = \frac{W_s}{\max\{\eta, y^{\alpha}(t)\}}. \tag{21}$$

In the above algorithm, $\varepsilon_p(t)$ can be considered as the expected price payment when the physical machine provides resources. At the equilibrium point, the expected price of the physical machine is the same as the price actually paid by the user.

3.5. Algorithm Implementation.

In a particular implementation of an algorithm, resource allocation is made according to the discrete expression of the algorithm. That is, at time t = 1, 2, each corporate sector p allocates resources according to the following expression.

$$x_{sr}^{p}[t+1] = \left((1-\varsigma)x_{sr}^{p}[t] + \varsigma\theta x^{p}[t]\left(\lambda_s[t] - \varepsilon_p[t]\right)\right), \tag{22}$$

$$\overline{x_{sr}^{p}}[t+1] = (1-\varsigma)x_{sr}^{p}[t] + \varsigma x_{sr}^{p}[t]. \tag{23}$$

Additional variables are introduced here, which are considered to be estimates of the optimal allocation of resources. Low-pass filtering is a filtering method. Through low-pass filtering, the algorithm fluctuation phenomenon is caused by the fact that the model is not strictly convex optimization and the optimal allocation of resources is not necessarily unique. Therefore, a low-pass filter model can be added to the original algorithm. The price paid for each application depends on the algorithms given in (17) and (18). In this chapter, a resource allocation model is designed to maximize server availability in a cloud environment, and the model is analyzed. After the analysis, specific expressions are obtained to optimize the resource allocation for each application. According to the resource allocation model, the optimal allocation of resources in the enterprise cloud service center is realized, and the convergence and stability of the algorithm are explained by using the optimization theory and stability theory.

4. Empirical Research on the Management of Construction Enterprises in the Ecological Environment

4.1. Enterprise Selection

4.1.1. Shanghai Construction Engineering Group.

Shanghai Construction Engineering Group is an industry-leading construction enterprise with total assets of 195.7 billion yuan. It consists of five departments: construction, construction, real estate development, design consulting, and urban construction. The company's business covers dozens of countries and regions in Asia, Africa, and Europe, ranking 9th in the "World's Largest 250 International Design Contractors" in 2018. R&D investment was 4.6 billion yuan, accounting for 3.24% of operating income, and there were 6,719 R&D activities. The total number of scientific researchers is 6,719, accounting for 19.2% of the total number of employees, and about 80% are university graduates. It has 1 national-level enterprise technology center and several technology research centers to develop new products for the company. It also has many high-tech companies. According to the 2017 financial statements released by Shanghai Construction Engineering Group, the company's operating profit in 2017 was about 142.1 billion yuan, a considerable increase from the total profit of the previous year. In recent years, the company's business has continued to grow, which is reflected in the fact that the value of newly signed contracts in 2017 increased by one-fifth over the previous year, of which the construction industry accounted for more than half of the annual contract value.

4.1.2. Group A. Group A is an unlisted group company. Relevant information is collected from the inside. The group has various general contracting qualifications for smelting, housing, municipal, steel structure, electromechanical, and road infrastructure projects. The company has total assets of 1.58 billion yuan and thousands of employees. A third of them have a university degree or higher, and they mainly work on domestic construction projects. In recent years, the average operating income of the enterprise is nearly 10 billion yuan, and the total profit is 200 million yuan. The annual investment in technology research and development and technology introduction accounts for more than 20% of the profit.

4.1.3. Construction Company B. Construction Company B is a company engaged in general contracting activities of construction projects. It has the second-level general contracting qualifications for housing construction projects and the second-level general contracting for mechanical and electrical installation projects. The total assets are 40 million yuan. In 2017, the company's operating profit was about 50 million yuan, and the total profit only accounted for 1 million yuan. The company has a total of 400 employees, including 97 juniors. The total number of action items in 2018 was 8, of which the national environmental inspector found that the company had caused great damage to the surrounding environment and there was no specific rectification in between. As a result, many migrant workers left the project, resulting in a shortage of project and late construction personnel. In the field of technology research and development and implementation, only about 200,000 yuan per year was sent to relevant operators to study and train abroad and won the Bashu Cup and Tianfu Cup.

4.2. Analysis of Ecological Competitiveness. This time, three types of construction companies of different sizes were selected for case studies. One is a large enterprise with a large business park and is listed on the stock exchange. This article chooses Shanghai Construction Engineering Group as the representative of such a company; the other is a company in the middle of the industry. Here, Group A is a good representative of the A type of company, a type of small business that basically survives the gap. In this article, B Construction Company was chosen to represent these types of companies.

According to the evaluation criteria of each single factor, 3 companies were investigated, respectively, and 15 domain experts who knew about these 3 companies were interviewed by means of a questionnaire survey. The results of the study are listed in Tables 1–3.

X11 indicates the ability of dealing with policies and laws, X12 indicates the ability of dealing with market risks, X61 indicates the degree of cultural integration of the project, and X62 indicates the greenness of green building products. The evaluation results of Tables 1 and 3 show that Shanghai Construction Engineering Group is much stronger than the other two companies in terms of its

TABLE 1: Evaluation results of the ecological competitiveness of Shanghai Construction Engineering Group.

Evaluating indicator	Outstanding	Good	Same as
X11	1	0	0
X12	0.9	0.1	0
X31	0.3	0.6	0.1
X32	0.4	0.4	0.2
X41	0.25	0.25	0.5
X42	0.35	0.2	0.45
X51	0.35	0.65	0
X52	0.15	0.1	0.75
X61	0.4	0.25	0.35
X62	0.35	0.35	0.3

TABLE 2: A group's ecological competitiveness evaluation results.

Evaluating indicator	Outstanding	Good	Same as	Range
X11	0.55	0.15	0.3	0
X12	0.55	0.45	0	0
X31	0.1	0.35	0.55	0
X32	0	0.1	0.65	0.25
X41	0	0.1	0.15	0.75
X42	0.4	0.6	0	0
X51	0	0	0.85	0.15
X52	0.15	0	0.85	0
X61	0.1	0.7	0.2	0
X62	0	0	0.65	0.35

TABLE 3: B group' evaluation results of ecological competitiveness of construction enterprises.

Evaluating indicator	Outstanding	Good	Same as	Range
X11	0	0	0.35	0.65
X12	0	0.3	0.55	0.15
X31	0	0	0.3	0.7
X32	0	0	0.35	0.65
X41	0	0.1	0.7	0.2
X42	0	0	0.35	0.65
X51	0	0	0.3	0.7
X52	0	0.25	0.55	0.2
X61	0	0.55	0.25	0.2
X62	0	0.1	0.15	0.75

ability of dealing with policies and laws and market risks. Construction companies are average in all aspects, especially in terms of greenness of green building products and implementation of environmental protection measures. The reason may be that smaller companies are relatively lacking management costs and ecological protection awareness.

4.3. Weight Analysis of Indicators at All Levels. This article is honored to invite 10 experts with rich experience in the construction industry to participate in the index analysis of this survey, including 7 masters and more than 4 with more than 10 years of industry experience. Each indicator score is
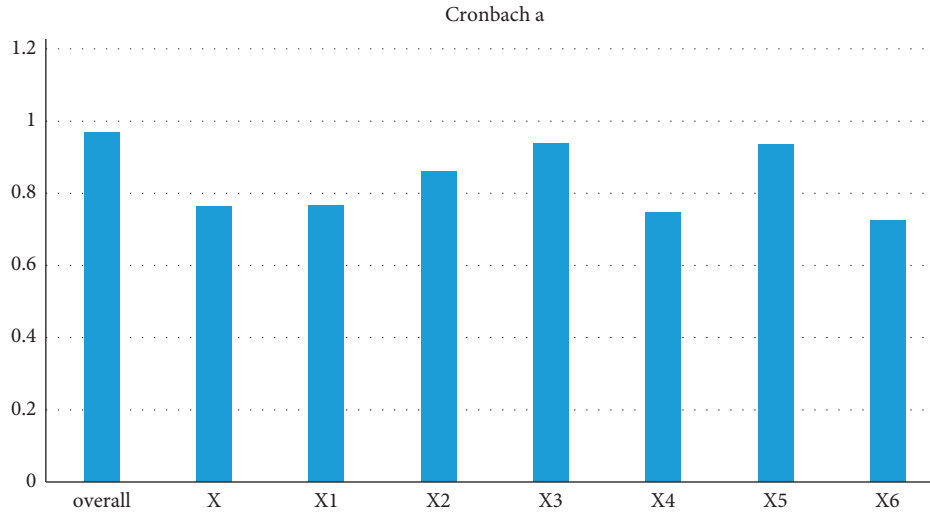
FIGURE 1: Cronbach a reliability test of each index layer.

designed to be 100 points. First, reliability tests are performed on different index layers and different module layers of the returned query data. The test results are shown in Figure 1. The reliability tests are all greater than 0.7, indicating that the data information is good and suitable for this study.

The Cronbach's alpha coefficient is a statistic and is the most commonly used measure of reliability. If the alpha coefficient reaches 0.7–0.8, it means that the scale has considerable reliability, and when it reaches 0.8–0.9, it means that the reliability of the scale is very good. X represents the competitiveness of enterprise ecological management, X1 represents the ability of the enterprise of dealing with the external environment, X2 represents the ecological capital capability, X3 represents the ecological management and construction capability, X4 represents the ecological construction standardization capability, X5 represents the implementation of ecological construction measures, and X6 represents the ecological product capability. The test results show that the environmental competitiveness of Shanghai Construction Engineering Group is at an excellent level, the environmental competitiveness of Group A is at a medium level, the environmental competitiveness of Construction Company B is at a poor level, and the environmental competitiveness of most companies is at a disadvantage. The weight of each indicator is calculated according to Table 4.

It can be seen from Table 4 that the competitiveness of enterprises in ecological management is slightly higher than the competitiveness of ecological project construction and the ability of ecological capital is slightly more important than the ability of dealing with the external environment and the ability of managing and constructing ecological financial risks. In the competitiveness of project ecological construction management, the ability of regulating ecological construction is more important than the ability of implementing ecological construction measures and the ability of ecological products. Ecological building

TABLE 4: Weights of evaluation indicators for ecological competitiveness of construction enterprises.

Evaluating indicator	Secondary index weight	Level 3 index weight
X11	0.3021	0.4976
X12	0.5254	0.5024
X31	0.3656	0.2092
X32	0.3323	0.1992
X41	0.3860	0.4965
X42	0.3216	0.5035
X51	0.2924	0.2125
X52	0.4746	0.2013
X61	0.5567	0.5050
X62	0.2379	0.4950

standardization can solve all the problems that may arise in the construction process. It is an effective environmental protection method for enterprises to improve construction efficiency and monitor construction safety and progress.

According to the set single-factor evaluation, the comprehensive evaluation results are divided into four grades: excellent, good, medium, and poor, and the corresponding score ranges are 100-90 points, 90-80 points, 80-70 points, and 70-60 points. The comprehensive assessment results of Shanghai Construction Engineering Group, Group A, and Company B were scored, with 95 points, 85 points, 75 points, and 65 points as the medians, respectively. The calculation results are shown in Figure 2. The comprehensive environmental competitiveness of Shanghai Construction Engineering is 87 points, that of Group A is 77 points, and that of Company B is 63 points.

From the comparison of the comprehensive evaluation results of the three groups in Figure 2, it can be concluded that Shanghai Construction Engineering Group invested a lot of money to protect and control the pollution of production waste, while Construction Group B did not meet the standards in the environmental inspection.
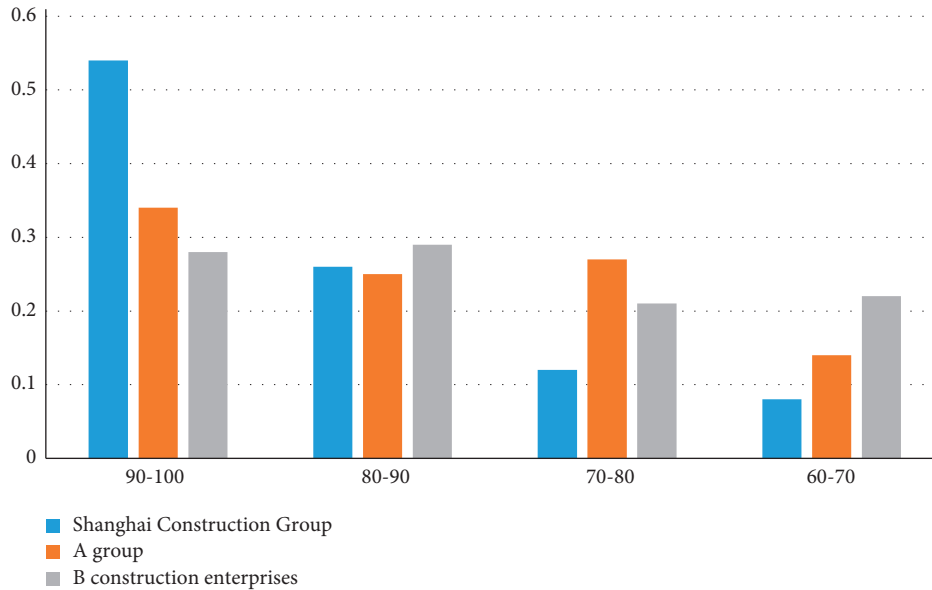
FIGURE 2: Comparison of the comprehensive evaluation results of the three groups.

4.4. Analysis of Evaluation Results. The environmental competitiveness evaluation of Shanghai Construction Group is excellent. Among them, the company has strong environmental management capabilities, good project ecological construction, and the company's environmental competitiveness is the strongest. Shanghai Construction Engineering Group attaches great importance to ecological talents and capacity building. Ecological technology research and development and innovation enterprises should increase ecological assessment and monitoring. The ecological construction competitiveness of the project is weak, among which the standardization of ecological construction is average, the implementation of ecological measures is good, and ecological products have certain competitive advantages (see Figure 3).

A. The environmental competitiveness of the enterprise is at the average level, the enterprise environmental management competitiveness is very poor, the project ecological construction competitiveness is slightly stronger than the company's environmental management, the external response ability is relatively strong, and the company's environmental management and construction are average and the proportion of ecological personnel and green suppliers. The ratio is low, the company's environmental capital capacity is poor, and the balance sheet total and profit margin are not high. In the ecological construction competition of the project, the structural standardization ability is at a good level, and the ecological measure implementation ability standardization ability is the weakest (Figure 4).

B. The environmental competitiveness of construction enterprises is poor, the ability of enterprises of dealing with the external environment and ecological capital in the competitiveness of enterprise environmental management is at a general level, and the ability of enterprise

environmental management and construction is also poor. The ratio between ecotalents and ecotech investments is seriously insufficient. The environmental protection in the construction process is not considered, there is a clear lack of green suppliers, and the project's environmental management capabilities are poor (as shown in Figure 5).

Judging from the weighted total score, Shanghai Construction Engineering Group has the strongest environmental competitiveness, followed by Group A, and Construction Engineering Enterprise B is the weakest. Most of the companies are still in the position of A Company and Construction Company B, which shows that the overall environmental competitiveness of my country's construction companies is not high. The results of case analysis show that the ecological development of my country's construction enterprises has problems such as ecological capital, weak operation and construction capabilities, and weak ecological construction standardization capabilities.

4.5. Research Conclusions

(1) In terms of environmental management, due to the company's low profit margin, low ability of protecting the environment, and low investment in green technology, the company's ecological capital and management and construction capabilities are relatively weak. The profit rate of Shanghai construction enterprises is 2.27%, the profit rate of Company A is 1.95%, and the profit rate of Construction Company B is 2.5%, which is significantly lower than that of other industries. The number of green suppliers obviously does not meet the company's environmental protection development needs. The ratio of environmental capabilities to
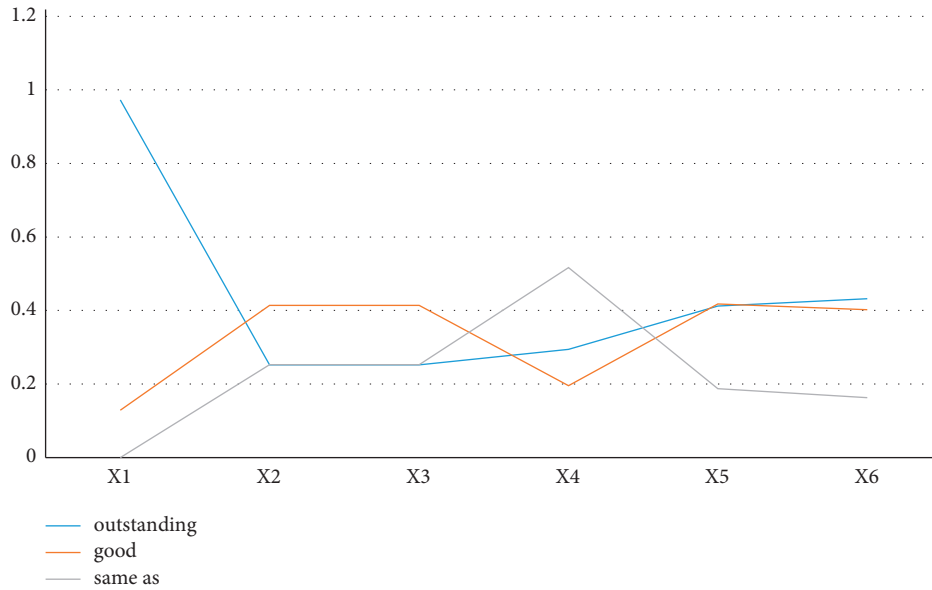
Figure 3: Comparison results of secondary indicators of Shanghai Construction Engineering Group.
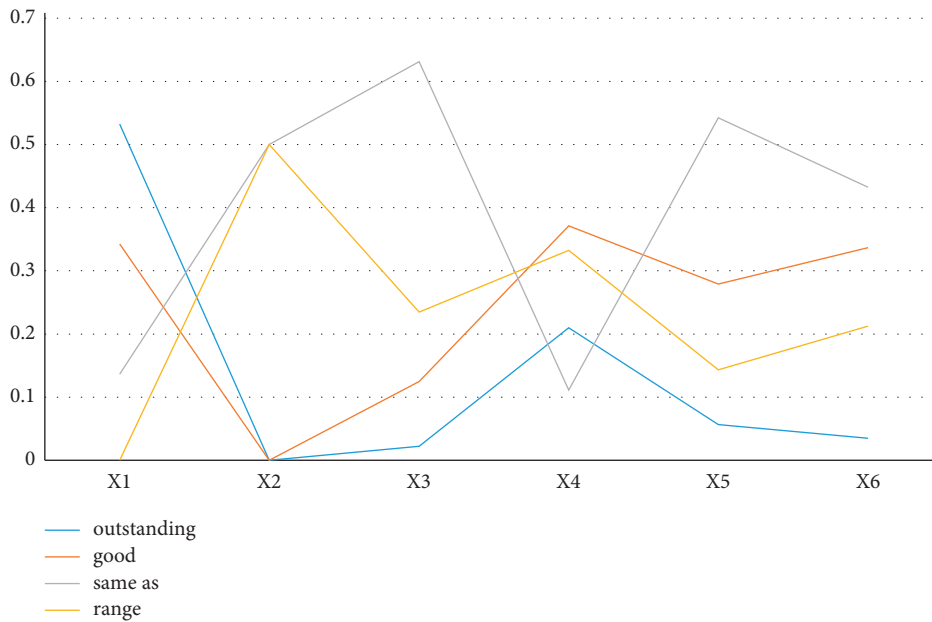
Figure 4: Comparison results of the secondary indicators of Group A.

ecological technology investment in two companies A and B is obviously insufficient, resulting in insufficient ecological environment management and construction capabilities of the company.

(2) The main problem in the ecological construction of the project is that the standardization ability of ecological construction is weak and it is difficult to improve the efficiency of ecological construction. The ecological construction competitiveness of Shanghai Construction Engineering Group's

projects is weaker than the standardization level of ecological management construction, but the implementation of ecological measures is good, and ecological products have certain competitive advantages. The standardization of construction of enterprise A is proportional to the implementation of ecological measures and the ability of ecological products is relatively weak, and the ecological competition position of Construction Company B is generally poor.
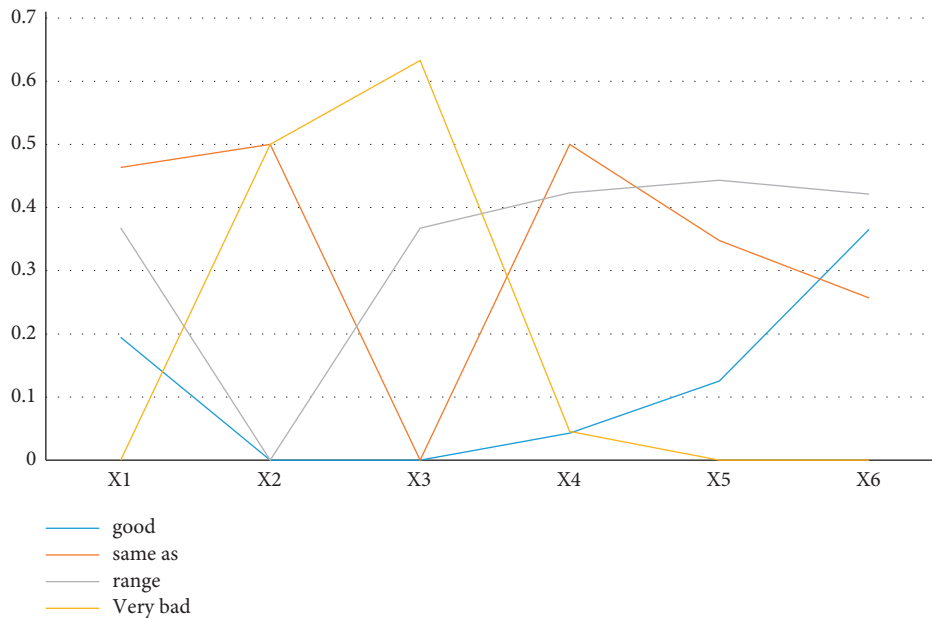
Figure 5: Comparison results of secondary indicators of construction enterprises in B.

5. Conclusion

This paper examines the ecological management of enterprises from the perspective of ecological environmental protection and green economy. The ecological management of enterprises is the starting point of the competitiveness of enterprises' normal production and operation. Through the research on the characteristics of construction enterprise management and its related sustainable competitiveness and green competitiveness, the connotation of construction enterprise ecological management is getting stronger and stronger. The competition of ecological engineering construction is the competition of ecological efficiency. The empirical research on the ecological management of construction enterprises shows that the ecological competitiveness of construction enterprises in my country is not high and the enterprises usually have problems such as low profitability and the number of green suppliers that do not meet the needs of ecological development. In response to these problems, we recommend that construction companies protect the ecological environment, achieve mutual benefit and win-win, long-term sustainable development, build an ecological supply chain, and improve the quantity and quality of buildings. At the same time, they formulate standards to improve the technological innovation ability of enterprises and improve the standardization ability of ecological construction. In practice, it is conducive to improving the ecological management capabilities of enterprises, conducive to ecological transformation of construction enterprises, and conducive to the construction of ecological civilization in the industry. The number of samples in this study can be further enriched, and the number of samples can be increased in subsequent studies. The enterprise resource model constructed this time conducts research on the operating cost of construction enterprises, and the results are subject to certain subjectivity. In the follow-up research, the model can be optimized to improve the objectivity of the evaluation results.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Hindawi

Research Article

Research on the Impact of Entrepreneurship Education on Employee Creativity from the Perspective of Career Environment Based on an Intermediary Model

Heli Wang [ID]**, Runkai Jiao, and Feifei Li**

School of Psychology, Northeast Normal University, Changchun 130024, China

Correspondence should be addressed to Heli Wang; wanghl001@nenu.edu.cn

Based on the human capital theory and creativity component theory, this study empirically examines the direct effect of entrepreneurship education on employees' environment protection creativity in the workplace and the dual mediating effect of boundary-free mental model and organizational mobility preference based on 266 valid sample data. The results show that entrepreneurship and environmental protection education received in colleges and universities can significantly promote the improvement of employees' environment protection creativity. Borderless mental model and organizational mobility preference play an intermediary role between them. The impact of entrepreneurship education on creativity is expanded from college students to employees through the bridge of borderless career attitude, which effectively verifies the lag effect of entrepreneurship education in colleges and universities and the dual intermediary effect of borderless mental model and organizational mobility preference. It further expands the research on the impact of entrepreneurship education in colleges and universities and has certain theoretical value.

1. Introduction

In 2017, China's concept of "mass entrepreneurship and innovation" was written into the UN resolution, which shows that innovation and entrepreneurship have become an international consensus in driving economic growth and social progress. In order to meet the needs of economic development in the new era, as one of the important ways to cultivate creative talents, entrepreneurship education has risen to a strategic height at the national level, which requires universities to carry out for all students and run through the whole process of talent training systematically. According to the 2017 survey, the rate of college students starting businesses in China has reached 3 percent, much higher than the average of 1.6 percent in developed countries. Despite the remarkable results of entrepreneurship education in colleges and universities, the vast majority of students who have received good entrepreneurship education at school always prefer to work in enterprise rather than to start a business after graduation. So, if most students do not start businesses, why teach them about entrepreneurship? Is this a waste of educational resources?

In order to answer the above questions, we must clearly recognize that entrepreneurship education is not only to improve the entrepreneurial rate of college students but also to cultivate the entrepreneurial spirit of students. The spirit of entrepreneurship is mainly manifested in innovation, risk tolerance, unity and cooperation, perseverance, and other fine qualities. The Basic Requirements for Entrepreneurship Education and Teaching in Ordinary Undergraduate Schools (Trial) formulated by the Ministry of Education in 2012 clearly points out that students' innovative consciousness and thinking should be cultivated through entrepreneurship education. Therefore, entrepreneurship education in colleges and universities is crucial for students to carry out entrepreneurship and innovation in the future. However, existing studies mainly focus on the impact of entrepreneurship education on entrepreneurship, including

entrepreneurial self-efficacy, entrepreneurial ability, entrepreneurial willingness, and entrepreneurial behavior, but ignore its impact on innovation. As a large number of college students with systematic entrepreneurship education enter the workplace and become the source of enterprise innovation, how to give full play to the lagged effect of college entrepreneurship education on enterprise creative talent training and open the "black box" of the relationship between college entrepreneurship education and enterprise employees' creativity in the workplace has become an urgent issue to be explored in the current college entrepreneurship education.

Creativity is the basis of individual innovation [1]. Although some scholars have explored the impact of entrepreneurship education in colleges and universities on creativity, most of them focus on college students, who have not yet entered the workplace, and their creativity is greatly different from that of workplace in application context and expression form. Workplace creativity refers to innovative and practical ideas put forward by employees for work and organization [2]. The creativity component theory of Amabile [2] points out that whether an individual has domain-related skills, creativity and intrinsic motivation will affect his or her creative performance. According to the human capital theory, entrepreneurship education, which mainly focuses on cultivating the basic ability of innovation and entrepreneurship and mainly aims at meeting the quality requirements of innovative talents, creates conditions for employees to improve their skills and creativity in the work field through resource and skill accumulation.

In addition, the Basic Requirements for Entrepreneurship Education in Ordinary Undergraduate Schools (Trial) clearly points out that students should be aware of the positive role of entrepreneurship education in their own career development. Entrepreneurship education in colleges and universities does not expect all educated students to start their own businesses. It only provides a choice for college students in career development planning, and its essence is to broaden the realization of human subject value. In the era of borderless career, there are more and more work intersections among employees of different organizations or departments [3]. Job-related creativity no longer follows the cultivation mode of closed door but requires employees to communicate across organizational boundaries and constantly update their work fields and creativity-related skills. Therefore, the attitude of employees towards borderless career is very important, and this occupation tendency is not only the value orientation advocated by entrepreneurship education in colleges and universities but also the innovative motivation internalized by entrepreneurship. Therefore, this paper argues that borderless career attitude plays an importantly intermediary role in the delayed impact of entrepreneurship education on employees' workplace creativity. Borderless career attitude includes two dimensions: borderless mental model and organizational mobility preference [3]. Although both mental model and organizational mobility preference represent the psychological tendency of individuals to work across borders, there are essential differences. Although employees with borderless mental model are keen on cross-border cooperation with others, they still stay in their current organization, while employees with preference for organizational mobility will serve other organizations outside their current organization.

2. Theoretical Basis and Research Hypothesis

2.1. College Entrepreneurship Education and Employee Creativity. Entrepreneurship education aims to cultivate students' entrepreneurial spirit, consciousness, and ability. Compared with professional education, entrepreneurship education is not limited to a specific education stage but to an educational orientation that runs through life and is oriented to the development of all mankind. In the teaching practice of colleges and universities, innovation and entrepreneurship education are often difficult to separate, because the entrepreneurial process is a series of creative activities. Therefore, entrepreneurship education is bound to include skills related to creativity, and good entrepreneurship education received by employees in college contributes to the improvement of their workplace creativity.

From the perspective of cognition, according to the creativity component theory of Amabile [2], domain-related skills, innovation skills, and internal motivation are the raw materials for the formation of employees' creativity. By integrating the concept of innovation and entrepreneurship education into professional education, entrepreneurship education helps students build a cognitive system and make comprehensive use of professional knowledge and innovative skills, so as to improve their problem-solving ability after work. In terms of internal motivation, entrepreneurship education stimulates employees' autonomy to explore, analyze, and solve problems by cultivating employees' entrepreneurial thinking. When Yang Tao analyzed the work motivation of employees of different generations, he found that compared with other employees, the new generation of employees explored more independently, learned new things more frequently and in greater depth, and had stronger intrinsic motivation. According to the motivational information processing theory, employees with high level of intrinsic motivation are more willing to challenge high goals, more motivated to complete creative and systematic information processing work [4], and more willing to try and learn new ways to solve problems [5]. From the perspective of social learning, entrepreneurship education helps the new generation of employees accumulate innovative knowledge and resources, so as to improve their innovative self-efficacy [6]. Innovative self-efficacy helps employees resolve work pressure by giving them the belief to solve problems at work, improve their sense of psychological security, and maintain a positive working state, so as to help stimulate their creative cognition and creative behavior. Therefore, this paper proposes the following hypothesis:

H1: Entrepreneurship education received in colleges and universities is positively correlated with employee creativity.

2.2. The Mediating Role of Borderless Mental Models. Boundary-free career attitude, first proposed by Arthur [7, 8], refers to an individual's attitude when choosing and managing career opportunities beyond a single employer or work boundary. It focuses on individual's flexibility, adaptability, and self-assessment in career development behavior, so as to achieve career success [9]. Borderless mental model, as one of the manifestations of borderless occupational attitude, reflects the individual's psychological preference and ability to spontaneously pursue boundary-spanning work relationships. Employees with boundless mental models tend to pursue working relationships across departments and organizational boundaries and are keen on establishing and maintaining positive relationships outside departments and organizations [3].

Studies show that education can influence the choice of individual career mode, and individuals with higher education level prefer the borderless career mode [10]. The ultimate goal of entrepreneurship education is to cultivate individual entrepreneurship, which plays an important role in shaping the borderless mental model of the new generation of employees. The so-called entrepreneurial spirit refers to the thinking mode of transforming innovative ideas into innovative practice planning under the guidance of innovative spirit. The new generation of employees with entrepreneurial spirit has both openness and rational cognition of opportunities and is good at reshaping resources and systems [11]. In addition, entrepreneurship education focuses on career guidance, which helps students to consider their future choices more actively after they start to work, develop their vocational adaptability, and accumulate social capital [3], so as to strengthen their sense of responsibility and cooperation to share experience and knowledge across borders. Therefore, the new generation of employees with entrepreneurial education experience tends to be more sensitive and open to working relationships across organizational or departmental boundaries.

Borderless mental model, as a professional value, is closely related to the creativity of the new generation of employees. Directly, the new generation of employees with borderless mental model is keen on creating and maintaining positive relationships outside the boundaries of the organization [3], so they are more likely to obtain professional support [12, 13] to provide conditions for their creativity. Indirectly, on the one hand, employees with borderless mental model have higher career satisfaction and easier access to emotional support, so as to achieve a positive emotional state [13]. Studies have shown that people have more creative thinking in a positive emotional state [14]. On the other hand, individuals with borderless mental models have a higher tolerance for uncertainty and ambiguity and are more willing to try highly innovative solutions at work [15]. In addition, Andresen and Margenfeld [16] believed that employees with borderless mental model are more likely to experience job transfer across functional departments. By establishing new working relationships, expanding social networks and cross-departmental mobility, the new generation of employees can accumulate experience in different fields and work roles [17], improve their skills and creativity in their work fields, and further stimulate their internal motivation for innovation. Therefore, this paper proposes the following hypotheses:

> H2: Entrepreneurship education received in colleges and universities is positively correlated with the borderless mental model of the new generation of employees.
>
> H3: The borderless mental model of the new generation of employees is positively correlated with creativity.
>
> H4: The borderless mental model of the new generation of employees plays an intermediary role in the relationship between entrepreneurship education and creativity.

2.3. The Mediating Role of Organizational Mobility Preference. Organizational mobility preference is another manifestation of borderless professional attitude, which refers to the psychological tendency of individuals to cross-border "real" and "physical" work flow [3]. The most essential difference between organizational mobility preference and borderless mental model is that although individuals with borderless mind are keen to cross-border cooperation with people, they will still stay in the current organization, and individuals with organizational mobility preference will serve other organizations in addition to the current organization. Employees with strong organizational mobility preference are more adaptable and even appreciate jobs that require competition among multiple employers [3], thus affecting employees' preference for crossing specific occupational boundaries. Previous studies have shown that education will affect individual employees' borderless professional attitudes, and employees with higher education usually benefit more from borderless professional attitudes [18]. Entrepreneurship education affects employees' willingness to flow among organizations by cultivating their employment concept and entrepreneurial spirit. First of all, one of the goals of entrepreneurship education is to change students' employment concept and career choice concept. Compared with professional education, entrepreneurship education helps to cultivate students' ability of rational career choice so that they can actively consider their future career choice and get rid of the career vacuum. Therefore, employees with entrepreneurship education have very clear career goals and plans before entering the organization and are not likely to change jobs frequently after entering the organization. Secondly, entrepreneurship education in colleges and universities cultivates the entrepreneurial spirit of students, who tend to have stronger promotion motivation rather than prevention motivation in career development and pay more attention to career development rather than occupational safety. According to the theory of adjusting focus, controlling focus motivation can shape employees' career attitude [19]. Employees with strong promotion motivation have higher career concentration and adaptability to occupational environment, and their organizational mobility preference tends to be lower.

Existing studies have shown that organizational mobility preference inhibits individual creativity. From an objective point of view, employees with high organizational mobility preference prefer to work for different organizations than those who only work for their current employer. On the one hand, these employees are less willing to make internal investment in their existing careers [20]; On the other hand, employers tend to reduce career support and resource investment for employees with strong organizational mobility preferences [21]. Therefore, the lack of self-career investment and organizational career support will have a negative impact on employee creativity. From the subjective perspective, employees with strong organizational mobility preference usually have lower career satisfaction [22, 23]. Low level of career satisfaction is more likely to stimulate employees' negative emotions. According to the theory of emotional expansion-construction, negative emotions limit the activity space and cognitive scope of individual thinking, thus inhibiting the improvement of employees' creativity [14]. Therefore, this paper proposes the following hypotheses:

H5: Entrepreneurship education received in colleges and universities is negatively correlated with employees' preference for organizational mobility.

H6: Employees' organizational mobility preference is negatively correlated with creativity.

H7: Employees' organizational mobility preference plays an intermediary role in the relationship between entrepreneurship education and creativity.

To sum up, the research model constructed in this paper is shown in Figure 1.

3. Research Design

3.1. Research Samples. Since the 17th National Congress of the Communist Party of China in 2007 proposed the idea of "entrepreneurship to promote employment," colleges and universities across the country have actively promoted entrepreneurship education. Taking Jiangsu Province as an example, by the end of 2008, 85% of colleges and universities had set up entrepreneurship education courses. In 2012, the Ministry of Education formulated the Basic Requirements for Entrepreneurship Education and Teaching in Ordinary Undergraduate Schools (Trial), requiring colleges and universities to carefully organize and carry out entrepreneurship education and teaching activities. The knowledge workers of the new generation after 1990 not only have generally received entrepreneurship education but also have different degrees of completeness in receiving entrepreneurship education. This group as the research object can obtain great variation in the measurement of entrepreneurial education perception, which is conducive to better solve the research problem. In January 2019, this study recruited post-90s knowledge workers with higher education to participate in the questionnaire survey. In order to improve the quality and recovery rate of the questionnaire, participants who effectively completed the questionnaire were promised a certain amount of cash reward. At the same time, in order to effectively avoid the problem of homologous variance, this study collects data at three time points. A total of 350 questionnaires were distributed for the first time, which mainly collected the respondents' personal information and their subjective perception data of entrepreneurship education received during the university, and a total of 336 questionnaires were recovered. One month later, 301 questionnaires were collected from the participants who answered the questionnaire for the first time. The data were mainly collected on employees' borderless career attitude (borderless mental model and organizational mobility preference). One month later, a questionnaire was sent to the participants who answered the questionnaire for the second time, mainly collecting employee creativity data and relevant information of their enterprises. A total of 283 questionnaires were recovered. After further eliminating the invalid questionnaires, 266 valid questionnaires were finally obtained, with an effective recovery rate of 76.00 (266/350), as shown in Table 1.

3.2. Measuring Tools. The main variables of this study were measured by the Western maturity scale, which strictly followed the translation and back-translation procedures. Firstly, two scholars in the field of entrepreneurship and management jointly translated the English items into Chinese and then back-translated the Chinese items into English until the back-translated items were clear and consistent with the original English. The measurement was measured by the 5-point Likert scoring method.

3.2.1. Entrepreneurship Education in Colleges and Universities (Cronbach's $\alpha = 0.840$). The 4-item scale developed by Walter and Block [24] was used to measure the subjective experience of entrepreneurship education received by individuals in colleges. The reliability and validity of the scale have been verified in the Chinese context.

3.2.2. Borderless Career Attitude. Borderless career attitude was measured using a 13-item two-dimensional scale developed by Briscoe et al. [3], which has been widely used in the Chinese context. Among them, the first 8 items measured the dimensionality of borderless mental model (Cronbach's $\alpha = 0.863$), and the last five items measured the dimensionality of organizational mobility preference (Cronbach's $\alpha = 0.839$).

3.2.3. Creativity (Cronbach's $\alpha = 0.863$). The 6-item scale developed by Grant [25] was used for measurement, which has been widely used by scholars in the Chinese context and has good reliability and validity.

3.2.4. Control Variables. Existing studies have shown that factors such as gender, age, education level, working years, position, enterprise size, and nature of employees have an
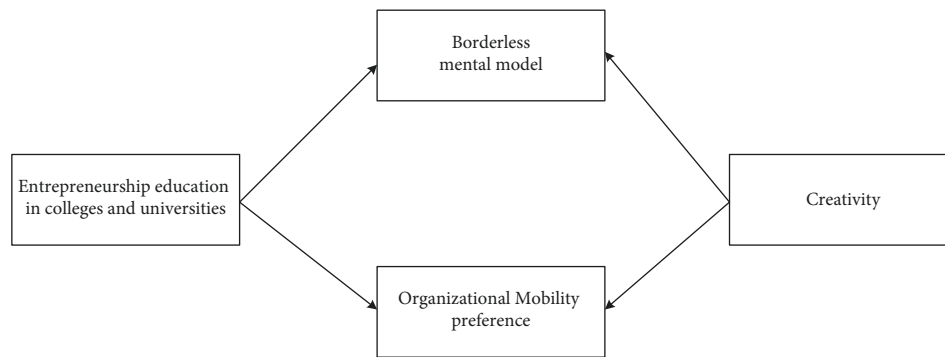
Figure 1: Theoretical research model.

Table 1: Basic characteristic distribution of effective samples.

Project	Category	Quantity	Percentage
Gender	Male	110	41.4
	Female	156	58.6
Age	Born in 1990–1994	142	53.4
	Born in 1995–1999	124	46.6
Highest education	Junior college and below	21	7.9
	Undergraduate	110	41.4
	Postgraduate (master's and doctorate)	135	50.8
Years of work after graduation	Less than 1 year	50	18.8
	1 year and above	65	24.4
	2 years or above	72	27.1
	3 years and above	46	17.3
	4 years and above	11	4.1
	5 years and above	22	8.3
Position	Ordinary staff	186	69.9
	Management at the grassroots level	56	21.1
	Middle and senior management	24	9.0
Enterprise scale	Less than 20 people	16	6.0
	20~50	12	4.5
	51~100	29	10.9
	101~200	17	6.4
	More than 200 people	192	72.2
Nature of enterprise ownership	State-owned enterprise	67	25.2
	Private enterprise	125	47.0
	Other	74	27.8

impact on the dependent variable creativity. Therefore, it is treated as a control variable in this study.

4. Hypothesis Testing and Result Analysis

4.1. Common Method Deviation Test. Although the data in this study were collected at different time points, they were all filled in by the same object. Therefore, it is necessary to adopt Harman's single-factor test to test common method deviation before hypothesis testing. The unrotated principal component analysis precipitated four factors with eigenvalues > 1, and the first factor explained the variance of 33.042, which was less than the critical point of 50. It can be seen that there is no serious common method bias in the sample data.

4.2. Correlation Analysis. The results of correlation analysis of main variables in this study are shown in Table 2. Entrepreneurship education received by employees in colleges and universities is significantly positively correlated with workplace creativity ($r = 0.377$, $P < 0.01$). Entrepreneurship education received by employees in colleges and universities was significantly positively correlated with borderless mental model ($r = 0.442$, $P < 0.01$) but negatively correlated with organizational mobility preference ($r = -0.365$, $P < 0.01$). Borderless mental model was significantly positively correlated with employees' workplace creativity ($r = 0.563$, $P < 0.01$), while organizational mobility preference was significantly negatively correlated with employees' workplace creativity ($r = -0.316$, $P < 0.001$). It can be seen that the

TABLE 2: Mean value, standard deviation, and correlation analysis of main variables.

Variable	Mean value	Standard deviation	1	2	3	4	5	6	7	8	9
(1) Gender	0.411	0.493									
(2) Age	1.534	0.5	0.065								
(3) Highest education	2.429	0.636	−0.05	0.192**							
(4) Working years	2.883	1.44	0.105	0.323**	−0.473**						
(5) Position	1.391	0.648	0.153*	0.064	−0.298**	0.478**					
(6) Enterprise scale	4.342	1.2	0.002	0.128*	0.316**	−0.152*	−0.197**				
(7) Entrepreneurship education	3.203	0.821	0.095	0.036	−0.09	0.068	−0.038	−0.187**			
(8) Borderless mental model	3.608	0.612	0.089	0.059	0.02	0.018	0.036	−0.094	0.442**		
(9) Organizational mobility preference	2.685	0.681	−0.157*	0.03	0.118	−0.099	−0.128*	0.048	−0.365**	−0.287**	
(10) Creative ability	3.602	0.612	0.214**	0.076	−0.029	0.096	0.107	−0.035	0.377**	0.563**	−0.316**

TABLE 3: Results of confirmatory factor analysis.

Model	Factor	χ^2/Df	GFI	CFI	TLI	RMSEA
Benchmark model	Entrepreneurship education, borderless mental model, organizational mobility preference, and creativity	1.807	0.93	0.966	0.957	0.055
Competition model 1	Single factor	10.904	0.602	0.551	0.476	0.193
Competition model 2	Zero factor	19.919	0.345	0	0	0.267
Competition model 3	Merging entrepreneurship education and borderless mental model	5.121	0.775	0.82	0.782	0.125
Competition model 4	Merging entrepreneurship education and organizational mobility preferences	5.569	0.74	0.8	0.758	0.131
Competition model 5	Merging borderless mental models and organizational mobility preferences	6.45	0.719	0.761	0.712	0.143
Competition model 6	Merging borderless mental models and creativity	4.19	0.819	0.86	0.831	0.11
Competition model 7	Merging organizational mobility preferences and creativity	6.17	0.725	0.774	0.727	0.14

research hypothesis has been preliminarily supported and is suitable for further hypothesis testing.

4.3. Confirmatory Factor Analysis.

In this study, confirmatory factor analysis (CFA) was used to investigate the differentiability among major variables. Considering that there are many measurement items for some variables and the effective sample size is small, in order to improve the overall model fitting degree, the borderless mental model and creativity measurement items are packaged separately according to the suggestion of Little et al. [26] before the implementation of CFA. After packaging, the results of CFA are shown in Table 3, and the fitting indexes of the 4-factor benchmark model ($\chi^2 = 151.756$, Df = 84, χ^2/Df = 1.807, GFI = 0.930, TLI = 0957, CFI = 0.966, RMSEA = 0.055) were significantly better than those of the competition model, which fully indicated that there was a high degree of differentiation among the four variables.

4.4. Hypothesis Testing

4.4.1. Main Effect Test.

The hierarchical regression results are shown in Table 4. The entrepreneurship education received by employees in colleges and universities has a significant positive impact on their workplace creativity (M2: $\beta = 0.364$, $P < 0.001$); H1 has been verified.

4.4.2. Mediating Effect Test.

This study draws on the regression method proposed by Baron and Kenny [27] to test the mediating effect of borderless mental model and organizational mobility preference between entrepreneurship education and creativity. The regression results are shown in Table 4. Firstly, the hypothesis that independent variable entrepreneurship education has a significant positive impact on dependent variable creativity has been supported in the main effect test. Secondly, the independent variable entrepreneurship education has a significant positive impact on the intermediary variable borderless mental model (M2: $\beta = 0.440$, $P < 0.001$); H2 has been verified. At the same time, the independent variable entrepreneurship education has a significant negative impact on the mediating variable organizational mobility preference (M4: $\beta = -0.382$, $P < 0.001$); H3 has been verified. Thirdly, after controlling the independent variable entrepreneurship education, the intermediary variable borderless mental model has a significant positive impact on the dependent variable creativity (M9: $\beta = 0.478$, $P < 0.001$); H4 has been verified. Similarly, the intermediary variable organizational mobility preference had a significant negative effect on the dependent variable creativity (M10: $\beta = -0.192$, $P < 0.01$); H5 has been verified. Finally, compared with M6, M9 (0.153 < 0.364) and M10 (0.290 < 0.364) showed a smaller effect of independent variable entrepreneurship education on dependent variable creativity. In addition, after controlling the independent

Table 4: Hierarchical regression analysis.

Variable	Borderless mental model		Organizational mobility preference			Creative ability					
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
Gender	0.079	0.032	−0.154*	−0.113+	0.194**	0.155**	0.151**	0.148*	0.140**	0.133*	0.127*
Age	0.065	0.044	0.032	0.051	0.038	0.02	0.002	0.047	−0.001	0.029	0.006
Highest education	0.03	0.039	0.072	0.064	0.044	0.051	0.027	0.065	0.032	0.063	0.041
Working years	−0.033	−0.055	−0.033	−0.013	0.034	0.015	0.052	0.024	0.042	0.013	0.039
Position	0.017	0.079	−0.071	−0.124+	0.054	0.104	0.044	0.032	0.067	0.081	0.053
Enterprise scale	−0.112+	−0.029	−0.004	−0.075	−0.025	0.043	0.035	−0.027	0.057	0.028	0.047
Nature of enterprise 1	0.042	0.051	0.079	0.071	0.03	0.038	0.007	0.054	0.014	0.052	0.023
Nature of enterprise 2	0.093	0.044	0.095	0.137*	0.153*	0.113	0.103+	0.181**	0.092	0.139*	0.109+
Entrepreneurship education		0.440***		−0.382***		0.364***			0.15 3**	0.290***	0.115 +
Borderless mental model							0.542***		0.478***		0.459***
Organizational mobility preference								−0.30***		−0.192**	−0.122*
Fitting index											
F	0.935	7.443***	1.710+	6.473***	2.579**	6.956***	15.987***	5.399***	15.464***	7.463***	14.720***
R^2	0.028	0.207	0.051	0.185	0.074	0.196	0.36	0.16	0.377	0.226	0.389
$\triangle R^2$	—	0.179	—	0.135	—	0.122	0.285	0.085	0.181	0.03	0.193

Table 5: Test results of double mediating effect.

Category	Effect value	Standard error	Lower 95% confidence interval	Upper 95% confidence interval
Indirect total effect	0.185	0.034	0.124	0.259
Indirect effects of borderless mental models	0.151	0.031	0.098	0.224
Indirect effects of organizational mobility	0.035	0.018	0.004	0.074
Indirect effect difference	0.116	0.038	0.047	0.199

variable entrepreneurship education, the regression analysis of the dependent variable creativity and the mediating variable boundary-free mental model and organizational mobility preference, respectively, found that the boundary-free mental model (M11: $\beta = 0.459$, $P < 0.001$) and organizational mobility preference (M11: $\beta = −0.122$, $P < 0.05$) still had a significant impact on creativity, and the influence of entrepreneurship education on creativity became marginal (M11: $\beta = 0.115$, $P < 0.1$). The above results fully demonstrate that borderless mental model and organizational mobility preference have significant mediating effects; H6 and H7 have been verified.

4.4.3. Double Mediating Effect Test. This study further uses the method of Preacher and Hayes [28] to test the multiple mediating effect through the process plug-in. The results are shown in Table 5. The total indirect effect of borderless mental model and organizational mobility preference is 0.185, and the confidence interval (0.124, 0.259) does not contain 0, indicating that the two mediating variables play a significant mediating role together. Among them, the indirect effect of borderless mental model is 0.151, and the confidence interval (0.098, 0.224) does not contain 0, indicating that borderless mental model plays a significant intermediary role; H6 has been verified. The indirect effect of

organizational mobility preference is 0.035, and the confidence interval (0.004, 0.074) does not contain 0, indicating that organizational mobility preference plays a significant mediating role; H7 has been verified. The comparison of the role of the two mediation paths shows that the confidence interval (0.047, 0.199) does not contain 0, indicating that there is a significant difference; that is, the mediation role of borderless mental model is significantly greater than that of organizational mobility preference.

5. Conclusion

Based on the human capital theory and creativity component theory, this study empirically examines the direct effect of entrepreneurship education on employees' creativity in the workplace and the dual mediating effect of boundary-free mental model and organizational mobility preference based on 266 valid sample data. The results show that entrepreneurship education received in colleges and universities can significantly promote the improvement of employees' creativity. Borderless mental model and organizational mobility preference play an intermediary role between them. The impact of entrepreneurship education on creativity is expanded from college students to employees through the bridge of borderless career attitude, which effectively verifies the lag effect of entrepreneurship education

in colleges and universities and the dual intermediary effect of borderless mental model and organizational mobility preference. It further expands the research on the impact of entrepreneurship education in colleges and universities and has certain theoretical value. At the same time, the conclusions of this study have brought beneficial enlightenment to entrepreneurship education and enterprise management practice in colleges and universities.

Data Availability

The experimental data of this research are available from the corresponding author upon request.

Conflicts of Interest

All the authors declared that they have no conflicts of interest regarding this study.

Acknowledgments

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Research Article

Model of Urban Marketing Strategy Based on Ecological Environment Quality

Feihan Sun [ID],[1] Chongliang Ye [ID],[1] Weirong Zheng [ID],[2] and Xumei Miao [ID][3]

[1]*Zhejiang College of Security Technology, Wenzhou 325016, China*
[2]*Wenzhou Medical University, Wenzhou 325035, China*
[3]*Shenzhen MSU-BIT University, Shenzhen 518172, China*

Correspondence should be addressed to Chongliang Ye; daogu1979@126.com and Weirong Zheng; wrzhwz@163.com

Ecological environment quality is increasingly becoming a critical priority in measuring the sustainable development of modern cities. Reflecting on the reality of contemporary urban development, we create a structural equation model with city image and ecological quality as the antecedents of sustainable urban development, reflect on and expand the existing models of sustainable urban development, and further explore the mechanisms of various urban marketing factors on the shaping of city image. The study found that the continuous improvement of city marketing assets contributes to the process of shaping sustainable city branding. City image has a direct and significant positive impact on city recognition, city reputation, and perceived quality. Ecological environment quality also has a direct effect on city recognition and no direct effect on perceived quality or city reputation. However, ecological environment quality can affect city's reputation by acting on perceived quality through city recognition and then enhance the competitiveness of city sustainable development. The case practice of shaping a city's image by ecological environment quality illustrates the pragmatic return of humanism in contemporary urban development. While the halo effect of city image still exists, a good city reputation becomes another important influence on perceived quality and sustainability. This study facilitates the development of urban sustainable development theory and the extension of urban branding innovation theory, which will promote international dialogue in the field of urban eco-environment in China.

1. Introduction

The annual report on social mentality of China (2021) points out that in the process of social development toward common prosperity, the sense of ecological security is not advanced. Ecological environment quality is becoming a precious business card of city image, and an important assessment index for sustainable development of cities in postindustrial society, moreover, it is the way to green development of a region and a country [1]. City marketing based on ecological environment quality, as a distinction from the postindustrial city's economic development politics in response to the ecological environment impact of elite governance [2], more from the level of national marketing [3], to establish a sustainable development view of ecological and environmental policies affecting city image, driving the

city faster, better and higher standards into the new vision of "Better City, Better Life" [4]. Urban marketing in postindustrial society is a process of innovative development and creative transformation of urban image, and it is also a contemporary interpretation of humanistic reversion, aiming at constructing a sustainable development paradigm with the integration of urban economic development, ecological environment, and cultural protection. Thus, the city's sustainable development competitiveness, green development index, city image, and quality of life can be significantly improved to realize the modernization of harmonious coexistence between humans and nature [5]. In addition, Sun and Ye [6] define city marketing as "the spatial expansion of social interactions with regional iconography." This means that people's understanding of city image depends on their perceived socio-spatial relations, identity, and

the differentiated connotation of city image in diverse geographical spaces, which provides the possibility of adding value to city image in a strategic sense by means of ecologically based city image in the cultural context of different target groups.

In parallel, with the advent of post-industrial society, knowledge economy, and creative era, spiritual production provides theoretical and practical paths to guide the sustainability of material production [7]. For local government, urban image production encompasses the preservation and transformation of built places, the creation of urban imagination and urban branding, and the reconstruction of social relations that people shape around the use of urban space. It is the interweaving and coexistence of three discourses: physical space transformation, spiritual space creation, and social space reconstruction [8]. The production of urban image is becoming increasingly common and ecological, and the needs of residents' life experiences are changing towards differentiation and complexity, but the desire for modern and better life is a significant development trend for the construction of urban image and self-enhancement [9]. However, distinct cities have remarkable variations in the level of productivity development, social governance, and quality of life, which achieve diverse ranges of urban experience creation in the synergetic creation of city marketing strategies and city images [10]. Unlike the city image constructed through the paths of tourism space [11], traditional cultural space [12], and new business consumption space [13], the city image shaping strategy targeting ecological environment quality responds to the needs of China entering a new stage of development in pursuit of high quality of life, and adapts to the identity reconstruction and expectations of local people for a new living environment.

In line with previous studies, the criteria for measuring the success of city marketing strategies are often based on the effective synergy of government publicity, media promotion, city industry construction, city operations, resource utilization, and event development [14]. Although studies have explored urban marketing and sustainable development, most are based on perspectives such as historical and cultural heritage [15], public policy [16], sporting events [17], marketing media [18], and an evaluation system of natural ecological environment quality by selecting indicators from air quality, greenness, resource consumption, and waste emissions [6, 19, 20]. Nevertheless, in the context of the constantly evolving international situation and the increasingly significant improvement of China's urban environment, it is worth further verifying and debating whether the existing theoretical models still have universal applicability and sufficient explanatory power. In postindustrial society, the pursuit of material satisfaction is far from satisfying human needs, and gaining spiritual satisfaction is often more likely to increase individual happiness and security, thus shaping people's new imagination of space to be able to establish a good image of space. Few studies have explored the human imagination of space and the construction of urban images from the perspective of focusing on the quality of natural ecological environment. Therefore,

based on the background of "spatial imagination" and "humanistic turn," the article further reflects on the contemporary urban development reality and verifies different influencing factors and mechanisms of urban marketing through empirical analysis of the case practice theoretical path of reshaping urban image by ecological environment quality. Meanwhile, it aims to expand the theoretical framework of sustainable urban development and provide case practice for contemporary urban ecology to fuel the value-added of urban image.

2. Literature Review and Research Hypothesis

Innovative development routes, the search for new economic driving points for cities, and a good image strategy for cities in parallel with economic transformation are paramount [21]. Cities with high recognition and reputation can gain a brand premium based on addressing audience needs [22]. The perceived quality of the city is exemplified by the audience getting spiritual pleasure and generating a sense of well-being and security to enhance the sustainable competitiveness of the city [23]. Stănciulescu [24] contends that the perceived quality of the city reveals the essence of city marketing and is the main source of realizing the value of the city's image. City reputation is also viewed by most scholars as the core of city marketing [25]. It is the basis for an assessment of the audience's experience of using urban space and the quality of services, indicating the city's own differentiated competitiveness, and is an important psychological consideration for the audience's final choice of consumption behavior, etc., [26]. In addition, it has also been noted that the value of a city's image is measured by the level of awareness it evokes in the audience, such as well-being [27]. The higher city recognition, the more information the audience is informed about the city and the more dominant the city is in the market [28]. Therefore, it is considered that city reputation, perceived quality, and city recognition are the three main dimensions of city marketing assets.

However, these 3 dimensions of city marketing assets are not irrelevant to each other. Zheng et al. [30] using community public sports services as a perspective, found that city recognition has a significant positive effect on city perceived quality, and city reputation is a mediating variable in the relationship between city recognition and city perceived quality. Molaei's [28] findings validated that both city recognition and city reputation have a significant effect on perceived quality. Du [29], after comparing the city marketing of Dalian, which enhances competitiveness with environment, and Qingdao, which strengthens industrialization, pointed out that there are significant differences between the city marketing of the two different development paths and that city recognition and city reputation directly or indirectly affect the perceived quality. Based on the abovementioned research insights, this paper proposes the following hypothesis.

*H*1: city recognition has a positive effect on perceived quality

*H*2: city reputation has a positive effect on perceived quality

*H*3: city recognition has a positive effect on city reputation

Well-being and security are the possibilities of the audience group's urban space utilization experience and service quality, and are the postpsychological stages of the audience group's spatial perception of the social development process [31]. Wang [21] stated that audience groups with high city marketing assets would respond more positively to city image shaping. Feihan et al. [7] posit that components of city marketing assets positively influence audience groups' perceptions and subsequent acquisition of a sense of urban well-being and security. Kim and Shim [32] conducted a study on the relationship and influence between spatial reputation and spatial well-being and security in a shopping place and showed that spatial reputation has a significant influence on spatial well-being and security. Zhang and Li [33] examined the well-being and security of tourist destinations and showed that perceived quality has a positive and significant effect on well-being and security. And Sun's [12] study on traditional cultural spaces in Suzhou showed that city recognition has a positive impact on well-being and security with perceived quality and city reputation as mediating variables and that when city recognition increases, perceived quality also increases and ultimately increases the competitiveness of the city for sustainable development. It can be seen that strengthening all dimensions of the city's marketing assets, it will help to form a good reputation and value for the city, establish positive experiences and values for the audience groups, and inspire a sense of well-being and security, thus forming a sustainable development of the city and the people's aspiration for a better life. Therefore, the following hypothesis is proposed:

*H*4: city recognition has a positive effect on well-being and security

*H*5: perceived quality has a positive effect on well-being and security

*H*6: city reputation has a positive effect on well-being and security

The concept of the urban image was initially proposed by Kevin Lynch [34] and refers to the ability of urban spaces to hold a public image among audience groups, consisting of five elements of a priori civic art traditions such as districts and landmarks, which in turn evoke mental images of audience groups, or Imageability [35]. Commonly, it is the description, word of mouth, or stereotype of a city, which is influenced by the quality of the city itself, its geographical features, economic and political background, and historical traditions [12]. Numerous audience groups tend to seek out city information to reduce the perceived risk of behavioral decisions before deciding where to work, where to live, or where to travel [36]. City image can be seen as a "guarantor" of a city's strategic positioning in the marketplace [37]. Dai and Zheng [38] revealed in their study of the city image of Nanjing, a historical and cultural city in China, that city image is a better predictor of audience groups' perceptions

and evaluative attitudes toward the city. Audience groups prefer to associate products exported from areas with better image marketing compared to cities with positive evaluations of high quality, value, experience, and reliability [39]. This leads to the following hypothesis in this paper:

*H*7: city image has a positive effect on city recognition

*H*8: city image has a positive effect on perceived quality

*H*9: city image has a positive impact on city reputation

In an economy with an overproduction of commodities, ecological security is a materialistic act and a symbolic symbol that conveys people's quality of life, values, and cultural preferences [40]. In China, the pursuit of urban ecological environment quality has received unprecedented attention, and audience groups have begun to enjoy the pursuit of ecology, individuality, organic, sentiment and environmental protection, and actively advocate the pursuit of a high level of ecological quality that can satisfy physical and mental enjoyment and good living. As identification and symbolic marker of a consensus for a good life, the symbolic meaning and symbolic value implied by ecological environmental quality have also become the main purpose pursued by individuals. The important output form of Chinese ecologism is individual, scientific, systematic, strategic, historical, and global, and is a new banner for the construction of beautiful China [41]. The ecological environment quality concerning the good life becomes a capital that can be flaunted as a matter of an individual's spatial identity and taste, with symbolic socio-cultural significance [42]. As a derivative of post-industrial society, eco-environmental quality fully reflects people's human-oriented pursuit of environmental orientation, spatial imagination, cultural concept, and life experience is driven by modern governance, new media, and other technologies. Also, the pursuit of eco-environmental quality is not only at the city level but also at the individual level, and the cultural level has to be created collaboratively, which determines the need to realize individual perceptions, values, renewal, and leap forward of the city image through the added value of marketing [43]. Accordingly, the following hypothesis is formulated.

*H*10: ecological environment quality has a positive impact on city recognition

*H*11: ecological environment quality has a positive effect on perceived quality

*H*12: ecological environment quality has a positive effect on city reputation

Through the above literature review and research hypothesis, the following conceptual model is proposed to explore the path and factor analysis of urban marketing based on ecological environment quality (Figure 1).

3. Methodology

3.1. Case Descriptions. W city is located in the most developed Yangtze River Delta metropolitan area in China. In recent years, while economic strength has increased
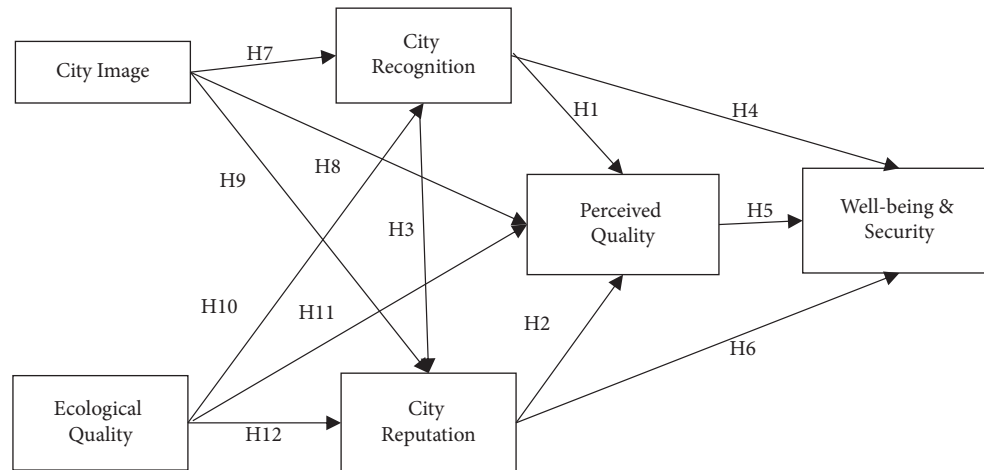
FIGURE 1: Conceptual model of city marketing based on ecological environment quality.

substantially, the system has advanced the reform of the ecological civilization system, and the construction of ecological civilization has become more effective, the quality of environmental beauty has become more distinct, and the people's sense of ecological well-being and security has been remarkably reinforced. The ecological and environmental development of W city has entered the strategic direction of carbon emission reduction, promoting pollution and carbon emission reduction synergy, promoting the comprehensive green transformation of economic and social development, and transforming ecological and environmental quality improvement from quantitative to qualitative [44].

In 2020, for instance, despite the impact of the epidemic, W City accomplished the action of zero direct discharge of sewage from 115 townships, 1,391 residential areas, and 63 industrial clusters, and fulfilled the technical transformation or new construction projects of 12 sewage plants with clean discharge. Ecological corridors are established in nature reserves, wetland parks, forest parks, etc., creating a greening rate of nearly 60% in the city. In addition, it also attaches importance to the conservation and management of biological species resources and the corresponding ecological security. Habitat improvement initiatives have solved problems such as environmental filth and disorder in rural areas, and have also boosted the civilization of the countryside. W city is a series of environmental management work, the initial realization of urban and rural ecological beauty of the whole area, and fully build into a beautiful China city model, the construction of a city suitable for living, entrepreneurship, and leisure [45]. Ecological environment quality is progressively becoming a salient factor in the behavioral decisions of audience groups and the experience of urban space in W city [46].

"Green water and green mountains are golden mountains" has become an important concept for the sustainable development of Chinese cities. Ecological environment quality has become a label for city image, high quality of life, etc. In the post-industrial society, talent has become the driving force of urban development, which can retain local people and also attract outsiders. W City, through marketing strategies, boosts the soft power of the city while building hard power, reinforces the well-being of its citizens, and makes ecological environment quality an important soft power for the city to attract talents. Marketing a favorable city image based on ecological environment quality makes green life a symbol of identity, interest, and taste for an individual in the city, and gradually evolves from a hard power of urban ecological construction to a "symbolic" soft power reflecting individuality and the pursuit of a good life [47]. According to the demographic data in the past five years, the population of W city is growing year by year, and it is among the top cities in the country in attracting talents to reside. It can be said that W city is a very representative typical case in the practice of city image sustainability upgrading, which has universal guiding significance for deepening the understanding of the ecological impact of nowadays globalization and the theory of innovative construction of city image in the Chinese economy and society.

3.2. Questionnaire Design and Variable Measurement. By tracking the results of the more recent literature, it was determined that the questionnaire contained six categories of city recognition, city reputation, perceived quality, well-being and security, city image, and ecological environment quality (Table 1), with a total of 27 questions, and the content of the questions was revised according to the actual case. The questionnaire was measured using a 5-point Likert scale, with higher scores indicating that the audience group agreed more vigorously with the description and, conversely, disagreed more heavily.

4. Result Analysis

4.1. Descriptive Statistical Analysis. Selected audience groups with a high perception of the city image of W as the research subjects, and official questionnaires were distributed through the (Wenjuanxing) website in February 2021. To ensure the quality of the online questionnaire, 20 questionnaires were first distributed for pre-study to adjust the questionnaire statements and estimate the

TABLE 1: Conceptual index system.

Variable	Indicator
City recognition	CR1 W is a very well-known city in China CR2 Whenever eco-city is mentioned, one can think of W CR3 W is the best in eco-city
City reputation	CP1 A city of ecology, preferred W, surrounded by parks and green fields CP2 I can hear the insects and birds chirping. CP3 I don't want to leave W
Perceived quality	PQ1 W's ecology is great PQ2 W has the best ecological environment among Chinese cities PQ3 W is trustworthy in ecological environment construction PQ4 I would recommend W to others
Well-being & security	WS1 I am willing to live in W WS2 I'll probably stay in W WS3 I always intend to develop in W WS4 I am extremely likely to choose W when working, traveling, etc. WS5 In order to settle in W, I will stay in W through employment, etc.
City image	CI1 Green shared city CI2 A city where people have a high quality of life CI3 Technologically advanced city CI4 A city with a high level of education CI5 Overall good feeling city CI6 City with less negative news CI7 A city with advanced ecological governance technology CI8 A city with sound ecological governance planning CI9 A city that has been successful in marketing eco-friendly concepts
Ecological quality	EQ1 A strong sense of personal satisfaction in living and working in a high-quality eco-friendly city EQ2 Having a good ecological environment makes me feel that the city is more civilized EQ3 Eco-friendly becomes a daily lifestyle routine for individuals

questionnaire response time. The minimum required response time for the subjects was 1 min, and for the sake of prudence, any response time ≤1 min was considered invalid, and the maximum response time was not required. Finally, a total of 351 questionnaires were collected, 31 questionnaires with extreme values were excluded, and a total of 320 valid questionnaires were obtained, with an effective rate of 91.16%.

The demographic profile of the sample was as follows: 24% male and 76% female; approximately 79% of the study population was 18 to 36 years old. 83.9% of the respondents live in W, of which 66.3% are residents, 22.9% are newly settled citizens, and 10.8% are college students educated in W whose households are not in W. In terms of education level, 37.6% are graduates and above, 36.3% are bachelor's degrees, 15.7% are vocational college, and 10.4% are high school and below. The geographical distribution of the sample covers most provinces in China. Therefore, overall, the sample size of this study adequately includes audience groups of different geographic regions, different cultural levels, different age levels, and different origins in China, and the sample coverage and intra-group variability are high, which can ensure the reliability and generalizability of the analysis results.

The mean and standard deviation of each variable index were calculated using SPSS 19.0 software, and the results are shown in Table 2. The results show that the mean values of the samples are all >3, which is in the middle to the upper level, indicating that the audience groups generally have a

TABLE 2: Means and standard deviations of variables.

variable	Indicator	Mean	Standard deviation
City recognition	CRA	3.946	0.742
	CRB	3.611	0.958
City reputation	CPA	3.491	0.787
	CPB	3.101	0.860
Perceived quality	PQA	3.206	0.931
	PQB	3.051	1.011
Well-being & security	WSA	3.071	0.984
	WSB	3.501	0.891
City image	CIA	3.559	0.841
	CIB	3.574	0.851
Ecological quality	EQA	3.436	0.879
	EQB	3.251	0.915

Note. Each variable has two indicators, *A* and *B*. The relationship between each indicator and each scale in the questionnaire is as follows. Indicator value = Total score of items included in the indicator/number of items included in the indicator, e.g., CRA = (CR1 + CR3)/2.

positive attitude toward the measurement indicators. Among them, the mean value of each indicator of city image is >3.5, the mean value of each indicator of ecological environment quality is >3.2; the mean value of city recognition is >3.6, and the general mean value of city reputation is >3.1, while the mean value of perceived quality is >3.0, and the mean value of well-being and security is >3.0. The numerical interval of the standard deviation is (0.742, 1.011), indicating that

a low level of dispersion in the sample. The above comparative analysis of the mean values of each latent variable reveals that although the city image of W has established the recognition of eco-city through marketing strategies, the city reputation, perceived quality, and the sense of well-being and security of the audience groups are lower than the city image and positioning created by W itself.

4.2. Reliability and Validity.

Exploratory factor analysis was performed on the data using SPSS 19.0 software, and the reliability of the variables was estimated using the internal consistency coefficient, Cronbach's α, in addition to the KMO test and Barlett's spherical test, and the results showed (Table 3) that the Cronbach's α values were all >0.77, indicating high reliability of the data. The factor loadings of each observation were >0.59, and the KMO values of the extracted common factors were ≥0.656, sig. <0.05, the Barlett's sphere tests were all significant, and the cumulative variance contributions were all over 64%, so the extracted six factors were reasonable [48]. The minimum Cronbach's α value for each latent variable was 0.773 > 0.7, indicating that the data had high reliability and internal consistency.

4.3. Validated Factor Analysis.

The data validity mainly includes content validity, convergent validity, and discriminant validity. Content validity relies primarily on previous research scales and a combination of expert opinions to ensure this. Convergent and discriminant validity relied on validation factor analysis [48]. The great likelihood estimation procedure of Lisrel 8.72 software was used to perform validation factor analysis for the six concepts in the model, using the correlation coefficient matrix of each variable indicator as the input matrix. The results showed that $\chi^2/\mathrm{df} = 4.39 < 5$; CFI = 0.96, NFI = 0.94, IFI = 0.96, RFI = 0.93, all >0.9; GFI = 0.73, slightly different from the general standard; RMSEM = 0.070 < 0.08, thus indicating a good fit of the econometric model to the data.

Convergent validity aims to measure the degree of association between different observed indicators under the same latent variable. If the factor loadings of the indicators in the econometric model are all highly significant, the data are considered to have good convergent validity. The results of the validated factor analysis of Lisrel 8.72 showed (Table 4) that the factor loadings of each indicator in the econometric model ranged from 0.60 to 0.89; the factor loadings of all indicators were significant (T ranged from 10.60 to 19.36), indicating a high convergent validity of each conceptual indicator.

Discriminant validity requires that the degree of association between different concepts is sufficiently low, and if the interval between the non-standardized solution and the standard error of plus or minus two times the correlation coefficient of each latent variable is calculated does not contain 1, then the validity of the data is good. The intervals formed by the non-standardized solution plus or minus two times the standard error of the correlation coefficients of each latent variable in this study all met the standard (Table 5).

TABLE 3: Data reliability.

Variable	Cronbach's α	KMO
City recognition	0.773	0.693
City reputation	0.821	0.714
Perceived quality	0.848	0.787
Well-being & security	0.858	0.818
City image	0.948	0.900
Ecological quality	0.805	0.656
Total	0.948	0.929

TABLE 4: Factor loadings and significant levels of indicators.

Variable	Indicator	Factor loading	T value
City recognition	CR1	0.69	11.21
	CR2	0.75	11.17
	CR3	0.82	11.92
City reputation	CP1	0.82	14.54
	CP2	0.81	14.85
	CP3	0.75	13.59
Perceived quality	PQ1	0.68	11.66
	PQ2	0.75	11.61
	PQ3	0.85	12.86
	PQ4	0.84	12.75
Well-being & security	WS1	0.80	15.28
	WS2	0.60	10.64
	WS3	0.85	16.33
	WS4	0.71	12.91
	WS5	0.78	14.70
City image	CI1	0.77	15.49
	CI2	0.77	15.74
	CI3	0.80	16.54
	CI4	0.85	18.09
	CI5	0.78	15.91
	CI6	0.81	16.94
	CI7	0.88	19.27
	CI8	0.88	19.12
	CI9	0.89	19.36
Ecological quality	EQ1	0.86	17.02
	EQ2	0.85	16.58
	EQ3	0.60	10.60

4.4. Structural Equation Analysis of Conceptual Model.

Structural equation analysis of the conceptual model was performed using the maximum likelihood estimation method of LISREL 8.72. After the initial run of data, the t-values of the paths between latent variables were obtained. Since the coefficients of the paths from "ecological environment quality to city reputation," "city recognition to perceived quality," and "ecological environment quality to perceived quality" are negative, and the $|T|$ values of the two paths from "city reputation to well-being and security" and "city recognition to well-being and security" are <1.96, so they are all deleted. The best results obtained after necessary model corrections showed that except for AGFI = 0.68, RMR = 0.055, GFI = 0.73, and RMSEA = 0.12, which were slightly different from the general criteria, $\chi^2/\mathrm{df} = 4.38$, NFI = 0.94, NNFI = 0.95, CFI = 0.96, IFI = 0.96, and RFI = 0.93 were all >0.90, all of which met the screening rules of the model indicators. With a sample size of <500 and a model that contains a large number of latent variables, it is

TABLE 5: Correlation coefficient and standard error of each latent variable.

	City image	Ecological quality	City recognition	City reputation	Perceived quality
Ecological quality	0.60 (0.05)				
City recognition	0.53 (0.09)	0.19 (0.08)			
City reputation	0.58 (0.08)	0.15 (0.07)	0.77 (0.10)		
Perceived quality	0.33 (0.05)	0.06 (0.03)	0.30 (0.06)	0.39 (0.06)	
Well-being & security	0.48 (0.07)	0.09 (0.04)	0.43 (0.08)	0.56 (0.08)	0.68 (0.13)

Note. The numbers outside the parentheses are the unstandardized values of the correlation coefficients, and the numbers inside the parentheses are the magnitude of the standard errors.
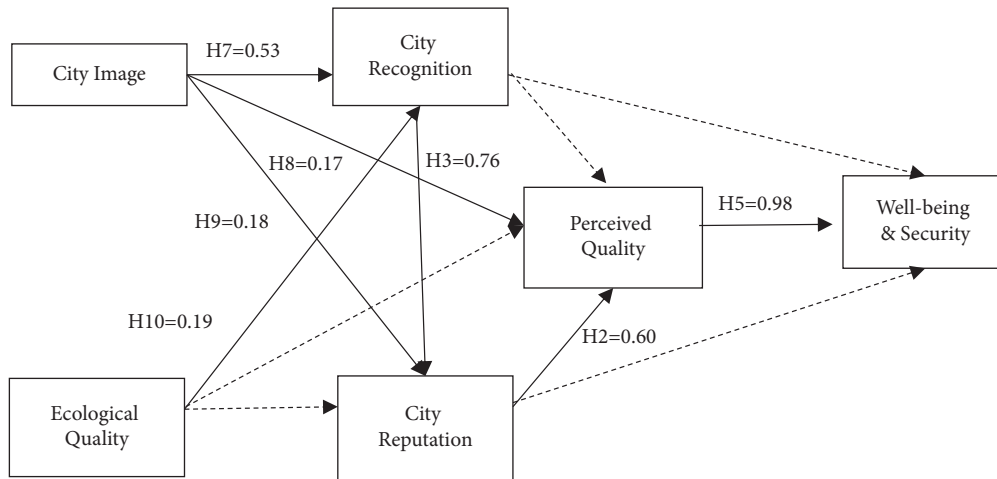
FIGURE 2: Fitting effect of structural equation model.

TABLE 6: Standardized estimates.

No.	Inter-variable relationship	Route	Standardized estimate	T value
1	City image⟶City recognition	H7	0.53	6.60
2	City image⟶City reputation	H9	0.18	2.57
3	City image⟶Perceived quality	H8	0.17	2.32
4	Ecological quality⟶City recognition	H10	0.19	2.50
5	City recognition⟶City reputation	H3	0.76	8.49
6	City reputation⟶Perceived quality	H2	0.60	7.04
7	Perceived quality⟶Well-being & security	H5	0.98	11.88

difficult to fully achieve the generally determining fit, and only a majority of the indicators can be measured as closely as possible [49]. Therefore, the fit of the model to the data in this study can be considered good. The path depicted by the solid line in Figure 2 shows the role relationship between the variables. That is, city image directly affects city recognition, perceived quality, and city reputation, ecological environment quality directly affects city recognition and indirectly affects city reputation, and city recognition can only indirectly affect perceived quality and sense of well-being and security through city reputation. Table 6 shows that *T*-values ranged from 2.32 to 11.88, preserving the path of significant standardized estimates of the relationship between variables.

Combining the results of the data in Tables 6 and 7 shows that city image and ecological environment quality have a positive and direct impact on city recognition, and further have an indirect positive impact on city reputation through city recognition. At the same time, city image also directly and positively affects the reputation and perceived quality of

the city. In terms of the impact between city marketing asset dimensions and on well-being and security, city recognition has a significant positive impact on city reputation, city reputation has a significant positive impact on perceived quality, and perceived quality has a significant positive impact on well-being and security. The two hypotheses of "city recognition has a positive effect on perceived quality" and "city reputation has a positive effect on well-being and security" are not valid. This study does not support the 2 hypotheses, *H*11 and *H*12. And it is further found that the hypothesis of *H*4 is also not significant, i.e., not only does ecological environment quality have no significant effect on city reputation but also does not positively and significantly affect perceived quality. This suggests that in post-industrial society today, there is no once-and-for-all paradigm for the role of ecological environmental quality in influencing the process of city image construction. The preliminary analysis is because, with the economic development and the expansion of the international horizon, a good ecological

TABLE 7: Indirect effects between latent variables in the structural model.

	City image	Ecological quality	City recognition	City reputation
City reputation	0.08 (5.71)	0.07 (2.47)		
Perceived quality	0.05 (5.52)	0.03 (2.37)	0.06 (5.94)	
Well-being & security	0.07 (7.62)	0.04 (2.38)	0.08 (6.16)	0.08 (7.40)

Note. The number outside the parentheses indicates the standardized coefficient of indirect effects, and the number inside the parentheses indicates the *T*-value of this standardized coefficient.

TABLE 8: Hypothesis results.

Hypothesis	Result
*H*1: City recognition has a positive effect on perceived quality.	N
*H*2: City reputation has a positive effect on perceived quality.	Y
*H*3: City recognition has a positive effect on city reputation.	Y
*H*4: City recognition has a positive effect on well-being and security.	N
*H*5: Perceived quality has a positive effect on well-being and security.	Y
*H*6: City reputation has a positive effect on well-being and security.	N
*H*7: City image has a positive effect on city recognition.	Y
*H*8: City image has a positive effect on perceived quality.	Y
*H*9: City image has a positive impact on city reputation.	Y
*H*10: Ecological quality has a positive impact on city recognition.	Y
*H*11: Ecological quality has a positive effect on perceived quality.	N
*H*12: Ecological quality has a positive effect on city reputation.	N

environment quality has become a landscape that every city takes for granted, and thus does not directly shape the perceived quality as a result. The impact of city recognition on well-being and security is not significant because it only affects the audience's attention to the city and does not directly lead to well-being and security unless the audience goes through the process of experiencing the city. City recognition also does not necessarily contribute to perceived quality and a sense of well-being and security due to factors such as service quality, social governance, and consumption levels. Similarly, the perceived quality of a city does not directly lead to a sense of well-being and security but indirectly determines the behavioral decisions and psychological satisfaction of the audience only after various factors are combined to achieve a certain perceived quality. In addition, this study confirms the hypothesis that "city image has a positive effect on perceived quality (*H*8)" (Table 8).

5. Discussion and Conclusion

This paper develops a city marketing model based on ecological environment quality. City marketing promotes the self-expression and identification of the inner personality of the audience group, highlighting the characteristics of the difference in city image and discovering the core elements that distinguish city image from other cities will help the audience group to perceive the uniqueness, rarity, and authenticity of the city image, so that the audience group can gain a sense of well-being and security, etc. In postindustrial society, the audience group of *W* city does not passively receive city marketing messages, but reflects and shapes the meaning of city image through the perceived city qualities of ecological environment quality [6]. The multiple narratives produced by city images in social reality [50], along with globalization and the occurrence of audience perceptions,

continue to innovate their distinctive personalities. Ecological environment quality provides precisely the necessary spatial hard and soft power base for understanding the meaning of urban marketing in various contexts.

The ecological environment quality has no direct impact on the reputation and perceived quality of the city, which is not in line with expectations. This paper postulates that with the development of the economy and the establishment of cultural confidence, nowadays people's ecological and environmental concepts are more rational and pragmatic. Second, globalization forces and local social development are interpenetrating and symbiotic, and the impact of globalization on ecological cities is a "localized" governance process [51], and improved ecological environments have become part of people's daily lifestyles. As urban development in China, today has popularized ecological environment construction, the extent to which urban ecological experience can directly meet the expectations of audience groups will determine whether they are willing to contribute to the sustainable development of the city. Therefore, this paper concludes that in the Chinese context of post-industrial social development, it is legitimate that there is no significant positive influence relationship between city reputation and perceived quality of audience groups based on the ecological environment of city image.

City reputation is an important mediator in shaping perceived quality, and perceived quality is the only path to a sense of well-being and security. City marketing needs to be based on strengthening the city's marketing assets [52]. From a marketing perspective, the higher the city's reputation, the better it is for the city to leverage the city's reputation to explore and address the lack of information in another emerging market in order to achieve city promotion goals across market segments. Compared with other city images, if the city's reputation is better, more stable, more

innovative, and better able to enhance the quality and experience of the city, it will be more beneficial to enhance the perceived quality of the audience group in order to successfully implement the city marketing value. This study proves that only the advantage of having city recognition is far from enough. Perhaps the combination of ever-improving aesthetics, practicality that follows the development of modern technology, experience that surpasses psychological expectations, and accessibility to a high quality of life are the practical considerations that trigger the audience's current sense of well-being and security.

By conducting further discussions on two types of cultural geographic factors, such as city image effect and ecological environment quality, this paper proposes and empirically proves the path hypothesis of city marketing, enriches the case study object and is an expansion of city marketing theory. Theoretically, it will not only help to promote the theory of city brand marketing in terms of eco-environmental quality but also promote the international dialogue in the field of eco-environmental and sustainable urban development; practically, in future research, two types of cultural geographic factors, namely urban image effect and ecological quality, can be further studied and discussed in depth; also, the variation in city image evaluation and well-being and security of different audience groups can be further studied.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Disclosure

Chongliang Ye, Xumei Miao, and Weirong Zheng are considered as co-first authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

Chongliang Ye, Xumei Miao, and Weirong Zheng contributed equally to this work.

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Retraction

Retracted: Exploration and Analysis of Educational History from the Perspective of Educational Environmental History and Environmental History

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] W. Li and L. Li, "Exploration and Analysis of Educational History from the Perspective of Educational Environmental History and Environmental History," *Journal of Environmental and Public Health*, vol. 2022, Article ID 3366343, 11 pages, 2022.

Research Article

Exploration and Analysis of Educational History from the Perspective of Educational Environmental History and Environmental History

Wei Li and **Li Li**

Graduate School, University of Perpetual Help System DALTA, Las Piñas 1740, Philippines

Correspondence should be addressed to Li Li; 15863074592@163.com

The emergence of environmental historiography, for the first time, organically combined the history of the environment and human history and began to pay attention to the close relationship between human social changes and environmental changes. This paper explores the impact of environmental history on education from the perspective of environmental history. This paper explores and analyzes the history of the educational environment from the perspective of environmental history and studies the laws and characteristics behind the evolution of the relationship between education and environment. This paper analyzes the influence of environmental history on the three views of college students under environmental education. Further analysis of educational environmental history is improved to improve the three views of college students and promote the social development of research significance. The study of educational environmental history is of great significance to enlarge the field of educational history research, enrich the content of educational history research, and perfect the discipline construction of educational history. At the same time, the environmental perspective and ecological consciousness of educational environmental history research are the embodiment and adherence of Marxist historical materialism and environmental view.

1. Introduction

Since the emergence of environmental historiography, human beings have gradually deepened their cognition and transformation of the world, and the world has formed a whole. The teaching of history is the elaboration and analysis of this process [1]. At present, most of the textbooks of general history in domestic colleges and universities focus on traditional political, economic, cultural, and military history [2]. Environmental degradation in the 1950s and 1960s led to the emergence of the environmental protection movement in the 1960s and 1970s in the United States, which promoted the emergence and development of environmental history [3]. In the late 20th century, environmental history emerged in the west, and some countries successively carried out environmental history teaching and literacy education courses in universities. However, there is no corresponding content update in history textbooks in

Chinese universities [4]. At present, with the increase in population, the global atmosphere is warming, the sea level is rising, extreme weather is emerging one after another, and environmental pollution is becoming increasingly serious, especially in the outbreak of COVID-19 [5]. Therefore, college teachers should do a good job in the education of students, permeate and emphasize the concept of love and protection of nature, and make contributions to the improvement of the world environment [6].

Environmental education is a kind of educational activity that arose in Western countries in the 1960s and 1970s. We advocate paying attention to nature and the environment, starting from youth education, and improving the environmental literacy and ecological awareness of the educated through practical activities [7]. Environmental education is developed under the background of Western countries' management of the environmental crisis, and its rise was closely related to the serious environmental

pollution problems faced by Western countries in the 20th century. Under the pressure of an increasingly severe environmental crisis, environmental education has gradually become the key content of education in Western countries [8]. Environmental education has become an effective means to arouse public environmental awareness and stimulate public environmental protection [9]. At present, there is no universally accepted academic definition of environmental education. In addition to educating people to protect the core of the natural ecological environment on which human beings depend, it also includes the extension of maintaining a stable organic social environment [10]. Its content involves many subjects such as pedagogy, ecology, sociology, environmental aesthetics, environmental philosophy, and environmental ethics, with strong comprehensiveness of subjects, pertinence of problems, and practicality of operation.

As for environmental education, some scholars have summarized and sorted out a series of theoretical thoughts closely related to environmental education [11]. Through carding philosophy and educational thoughts, it is not difficult to find that many forward-looking ideas and reflections related to environmental education are worth learning [12]. These valuable theoretical resources can guide the development of environmental education in today's era.

The philosophical thoughts of environmental education can provide basic philosophical principles for environmental education and avoid the dilemma that environmental education can only be based on common sense [13]. Comparatively, domestic scholars have not paid enough attention to the close relationship between environmental education philosophy and education. The analysis of environmental education is still weak, and there is no systematic and indepth study on this problem. This paper attempts to explore Dewey's thought of environmental education through the analysis of geography and history education [14]. It is helpful for educators to thoroughly understand the essence of environmental education and firmly grasp its philosophical foundation, so as to develop environmental education better [15].

Environment is the common basis and home for human beings and other living things to survive and develop [16]. For hundreds of millions of years, the Earth's environment has not only changed under the influence of natural and man-made factors but also entered into human society, politics, economy, culture, life, and other fields [17]. History has long been human-centric, with little regard for the environment or other species. It was not until the emergence of environmental historiography that it first organically combined the history of the environment with the history of human beings and began to pay attention to the close relationship between the changes in human society and the changes in the external environment [18].

Education, as an important activity of human society and a major component of human culture, is inextricably linked with the environment [19]. What are the effects of environmental change, technological innovation, cultural production, and the relationship between human beings and other living things on educational ideas, activities, and institutions? How did people in history pass on their perceptions of the environment to future generations through education? How does this knowledge affect future generations' adaptation and the use of the environment? How has education historically responded to environmental change or to environmental problems such as floods, droughts, diseases, and plagues? Do these measures have any warning and reference for current environmental education and sustainable development education? Such questions are worthy of scholarly inquiry [20]. It is not only necessary but also urgent to bring the environment into the scope of investigation of the history of education and to pay attention to the interactive relationship between education and the environment in history, no matter from the perspective of expanding the field of discipline or practical guidance [21]. This paper aims to explore the basic connotation, research content, theoretical methods, and value significance of the history of the educational environment, which thus lays a foundation for better research on educational environmental history.

This paper consists of five main parts: The first part is Introduction; the second part is State of the Art; the third part is Methodology; the fourth part is Result Analysis and Discussion; and the fifth part is Conclusion.

2. State of the Art

2.1. History of Education. The history of education is the history of education created and practiced by people, the history of education recorded and described by people, the history of education thought and studied by people, and the history of education that people consciously and systematically ponder and study. History of education is a subject with a spiritual edifying function. It helps students better understand people, ideas, cultures, and traditions through understanding the historical process of educational development of other countries and nations, thus providing help for the formation of a broad global and world vision.

The history of education includes three levels: The first level refers to the history of education as "historical facts"; that is, all kinds of events related to education happened in the past. The second level refers to the history of education as "historical materials," which refers to the past knowledge about education that has been recorded in various forms, that is, the past of education that has disappeared but has not disappeared. The third level refers to the history of education as an academic research field, which refers to the current researchers' understanding and narration of various education-related events in the past.

For the researchers of the history of vocational education, the so-called history of education is to construct the history of education of the third level based on the history of education of the second level. The researcher's "lofty ideal" is to make the educational history of the third level as close as possible to that of the first level. This is the whole purpose and core mission of the history of education research.

Yet for the average person or most teachers, the history of the first and second levels of education is of little value. They do not necessarily have the interest or need to

understand the history of education at these two levels. What they are exposed to is mostly the use of educational history. History of education is used for teaching, propaganda, providing background information for practical research of education, summarizing historical laws, and even for entertainment and consumption. The history of applied education can make necessary choices and trade-offs according to the actual needs. However, this kind of choice and trade-off is not distortion, and distortion, authenticity, and accuracy are still its criterion.

In a long period of time, restricted by historical, political, and realistic factors, the study of educational history appeared like the phenomenon of putting the cart before the horse. We regard the application of educational history, an adjunct of the study of educational history, as the whole purpose of the study, and judge the value of the study of educational history on this basis, but we do not analyze the essence of the study of educational history. The application of educational history needs to be fully studied. For several questions such as what if we research on educational history is, what are its properties and characteristics, and its value and significance, and where the problems such as not fully understanding and grasp, and is there much talk about the law of education history summary and grasp, education history enlightenment, and reference for education reality, the result must be education using the chaos and blind, and short-sighted and utility laws in the study of educational history.

2.2. Environmental Education. For environmental education, extensive and profound philosophical thoughts should originate from life and ultimately point to life. Therefore, the thought of environmental education is fully embodied in the later practice and development. The empirical educational view of environmental education, the consciousness of the big environment, the description of the importance of the natural environment represented by geography and the social environment represented by history, and the inextricable and interdependent relationship between the two have all become the typical issues concerned by environmental education. The subsequent development of environmental education has been proved by a large number of educational practices.

The purpose of environmental education is to improve students' understanding and adaptation to both natural environment and social environment. At the beginning of its development, environmental education attaches great importance to enriching the connotation of "environment." We should focus on the natural environment, not just the natural environment but also the social environment. Environment not only means the objective things around human beings but also refers to the various relations that play a role in human production and life. Although such relations are invisible and intangible, they play a non-negligible role in human survival and development.

In practice, environmental education attaches importance to infiltration education of discipline. No separate courses of environmental education should be set up in subject teaching and education. It is necessary to carry out infiltration education and integrate the connotation of environmental education with various disciplines. We should naturally acquire environment-related knowledge and skills through disciplinary penetration. Penetrative environmental education is closely related to Dewey's empiricism. The content of environmental education is not independent, but integrated with various disciplines, not divorced from the actual life experience can be geography, history, and environmental education content organically combined. In this case, the teacher's knowledge of various subjects can be organically combined with the environment-related insights gained by students through experience. In this way, environmental education comes into play naturally.

Environmental education emphasizes interdisciplinary cooperation between the humanities and the sciences. Engel in Harvard University believes that environmental education for both human beings and the Earth must be the scientific, social, and cultural field of vision; we should know how to deal with the environment and how to do to care for the environment, which is not only a problem facing humanity and literature, but it also involves the social sciences and is more closely associated with cognitive science and technology innovation. The humanities and the sciences are not independent of each other. They face the same theme of human union but with different emphases. At present, environmental science knowledge and environmental ethics occupy an important position in environmental education. Environmental science knowledge focuses on understanding the environment and developing the ability to solve environmental problems. Environmental ethics focuses on adjusting the relationship between human beings and nature from the perspective of values and helps to arouse human beings' feelings of cherishing and protecting the environment.

Environmental education in addition to school environmental education, outside school environmental experience, is also an indispensable part. Compared with school environmental education, which mainly focuses on teaching environmental knowledge, the off-campus environmental experience focuses on the practice of knowledge. In Canada, some primary and secondary schools take environmental protection centers outside schools as an important front for environmental education, implement environmental education outside schools in combination with in-school education, use outdoor practice to help students understand the relationship between man and nature, and practice the concepts learned in class. Established more than 50 years ago, the Toronto regional environmental protection center in Ontario, Canada, is an important base for environmental education in the region. The Centre operates eight program centers that provide curriculum-based programs and receive more than 185,000 environmental learners each year. To the student, what is learned in the classroom is a lifeless, dry argument unless filtered through practical experience. And when the knowledge learned in class is combined with the live experience, the dull knowledge immediately becomes vivid, and the students' mind will be full of vitality.

In fact, as early as the founding of experimental schools, we can see the figure of environmental experience. The students grow crops on reclaimed land. Through such gardening activities, students learn about the natural environment such as soil chemistry and the relationship between plants and the weather. More importantly, students learn about the ways in which agricultural activities are organized more efficiently, which is a very important knowledge of the social environment in the history of human development.

Through the experience of the off-campus environment, daily experience expands its meaning because it is related to the knowledge learned, and the things learned become vibrant and tangible because they are directly involved in the current activities. The vitality of practice is essential to the pursuit of new knowledge and new experiences. Therefore, the enthusiasm of students will greatly increase, and then, the thirst for knowledge in the classroom will greatly increase, and the desire to actively acquire new knowledge will also increase.

Since the middle and late 20th century, human society has stepped into a period of rapid development and the rapid improvement of the economic level at the expense of the ecological environment; industrial pollution has brought serious consequences and even threatened the survival of human beings. At such a historical juncture, people must begin to pay attention to environmental protection and strengthen environmental care. For the personnel engaged in education, if the essence of environmental education cannot be grasped, the application of the concept in practice is prone to deviation. And the environmental education thought can provide us with the theory essence that is easy to grasp. Deeply rooted in people's daily experience, environmental education thought directly reaches the core problem of environmental education; it brings us a new concept and a new practice mode; this concept and mode come not only from practice but also to practice. The discussion is aimed at the current human situation, and it is such ideas and practices that make environmental education still out of date today.

Since the 1970s, although some progress has been made in China's environmental education, due to the lag of theoretical research and other reasons, environmental education has not been fully developed, let alone achieved fruitful results. Some education experts believe that in order to solve this problem, we should first deepen the research on major theoretical issues of environmental education, and should have an international perspective and draw on international wisdom.

3. Methodology

There are a large number of college students in colleges and universities. Environmental education is particularly important in college students' life and study. College students have a strong thirst for knowledge and are easy to accept new things. Besides, their three views have not been fully formed and are easily influenced by environmental history.

3.1. Impact of Environmental History on Education.
In this random sampling survey, there were 213 male students and 255 female students. Among them, 114 are junior college students, 246 are undergraduate students, and 108 are graduate students. Among the political status of college students, democratic parties account for the least proportion, followed by the masses, followed by communist party members, as shown in Table 1.

The research in Figure 1 is to find out college students' understanding of environmental history: 3.8% of college students said they knew it very well; 20.10% of college students said they knew better; 43.80% of college students said they did not know much about it; and 32.30% of college students said they did not understand. It can be seen from Figure 1 that the recognition rate of environmental history among college students is not very high, and many college students do not understand it.

3.1.1. Influence on College Students' View of History.
The view of history is the general and fundamental view of history. Figure 2 is aimed at the question "Does environmental history have an impact on students' view of history in education." 72.4% of college students believe that there is a close relationship between the two and that the formation of college students' view of history is influenced by environmental history in the process of education. 23.2 percent of college students may have a connection. A small number of college students think there is no necessary connection between the two. It can be seen from the survey results that the vast majority of college students have a clear understanding of environmental history and can make a clear judgment.

Do you think education should be combined with historical environment? The results of this survey are shown in Figure 3: 42.6% of college students believe that environmental education can guarantee the correct development of college students' view of history; 23.8% of college students think adding environmental education may be beneficial; 26.3% of college students thought it was unclear; and 7.3% of college students cannot add it, thinking it is not meaningful. It can be seen that the vast majority of students hold positive views on environmental education. Yet, there are still some college students who cannot accurately grasp. Therefore, it is necessary to strengthen college students' cognition of environmental education's view of history.

In addition, some scholars point out that "we should fully realize the important role of environmental education in the long history and realize the limitation of heroic historical view" in the research on the influence of environmental history on historical view. By comparing the investigation and research of Chongqing university students on the theory of historical principal motive force, the author finds that most students can realize the importance of the people, while some students cannot correctly understand the important role of environmental education in history. Nowadays, with the complexity of environmental history, college students' views on history are also diverse. Most college students can resist pressure and public opinion and

Table 1: Basic composition of the sample.

Variable	Variable mesh	Effective number	Effective percentage
Gender	Male	213	45.5%
	Female	255	54.5%
Political landscape	The Chinese communist party member	94	20.0%
	The communist youth league	350	74.8%
	The crowd	22	4.7%
	The democratic parties	2	0.5%
Record of formal schooling	Specialized subject	114	24.3%
	Undergraduate course	246	52.6%
	Postgraduate and above	108	23.1%
The discipline nature	Section	295	63.0%
	Institute of class	131	28.0%
	Other	42	9.0%
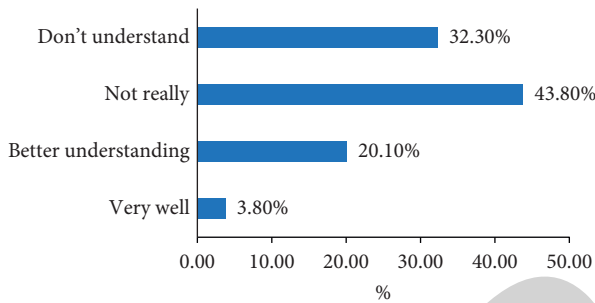
Figure 1: College students' understanding of environmental history.

Figure 3: Investigation into the idea of combining education with historical environment.

Figure 2: Investigation into the influence of environmental history on students' view of history in education.

stick to a correct view of history. However, some college students will be influenced by environmental history and cannot adhere to a scientific view of history. A small number of college students are affected by the incorrect environmental history, which affects the correct view of history.

3.1.2. Influence on College Students' Values. Values affect the value orientation of our country and even the whole nation. College students generally have a curiosity mentality and are easily interested in new ideas that are different from traditional ones. However, as the values of college students have not been formed, they are easily induced by bad ideas.

In Figure 4, the question "What is the impact of environmental history on college students' values in the education process?" is investigated: 5.8% of college students believe that values are completely influenced by the environment; nearly 50% of college students' values are highly likely to be affected by the environment; 43.9% of them say that their values may not be affected by the environment; and very few of them think that their values are not affected by the environment at all.

Environmental history has a great influence on education and further on students' values. Different educational environments have great differences in values. In Figure 5, the question "Which is more beneficial to shaping values, school education, or family education?" is investigated: 38.9 percent of college students think the educational
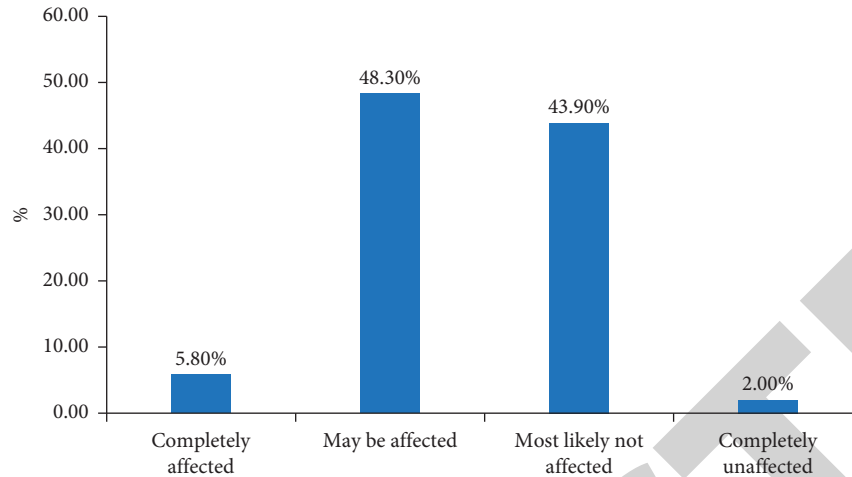
FIGURE 4: Influence of environmental history on college students' values in the process of education.
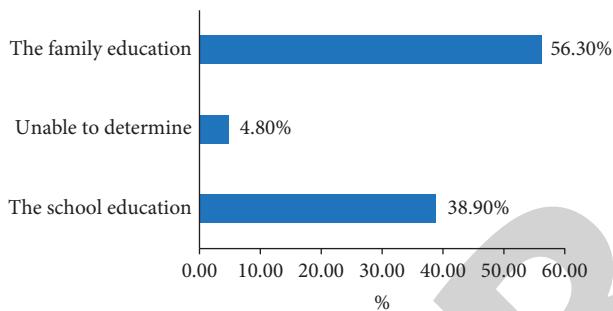
FIGURE 5: Which is better for shaping values, schooling, or home schooling?

environment is more favorable; 56.3% of college students think family education has a great influence on their values; and 4.8 percent said they could not tell.

In Figure 6, the question "Which is the greater influence of theoretical education or practical education on values?" is investigated; 36.0 percent of college students think theoretical education has a great influence. 19.0% of college students should be influenced by practical education. 24.0% of college students think both theoretical education and practical education are very important. 20.0% of college students said they were not clear about the relationship between them.

3.1.3. Influence on College Students' Political Views. Political view refers to people's general views and views on current national politics, covering the value selection and behavioral direction of political subjects. Adhering to the correct political outlook is conducive to social members' understanding of the country, to the implementation of major national policies, and to the improvement of national governance and social governance capacity. Analysis of the impact of environmental history on the political education of college students is performed. In Figure 7, the question "What do you think of the impact of environmental history on college students' political outlook?" is investigated: 56.8%

of college students believe that environmental history is closely related to political education and that we should insist on the political education of students and attach great importance to the influence of environmental history; 19.3% of college students may have related to environmental history and political education; and 23.9% of college students disagree and think there is no relationship between the two. Most students have a clear understanding of political views. Political education should be further optimized with the influence of environmental history. Few believe that the shaping of political views has nothing to do with environmental history.

In Figure 8, the question. "How to shape a better political view by combining environmental education?" is investigated: 59.8% of college students said that political views are closely related to environmental history, and they should receive good environmental education to strengthen their political stance; 28.3% of college students believe that there are many factors influencing their political views, not just environmental education; and 11.9% of college students said they were not sure.

Practical experience tells us that we should always adhere to our political beliefs and strive for our country and people, and rigorously study correct environmental history.

3.1.4. Influence on College Students' Inheritance of Traditional Culture. Some scholars point out that traditional culture is a time-tested excellent culture that includes ethics and morality. It is not achieved overnight, but through the baptism of years, the test of practice is just handed down. The traditional Chinese culture has passed the test of history and is the essence of the nation. We should continue to learn its essence and pass it on from generation to generation. Obviously, wrong environmental history can take advantage of college students' curiosity, break history, and mislead people's eyes. If allowed to develop willfully, it will erode the formation of three views of college students, shake their political ideals and beliefs, and affect the inheritance of Chinese culture, and the consequences are unimaginable.
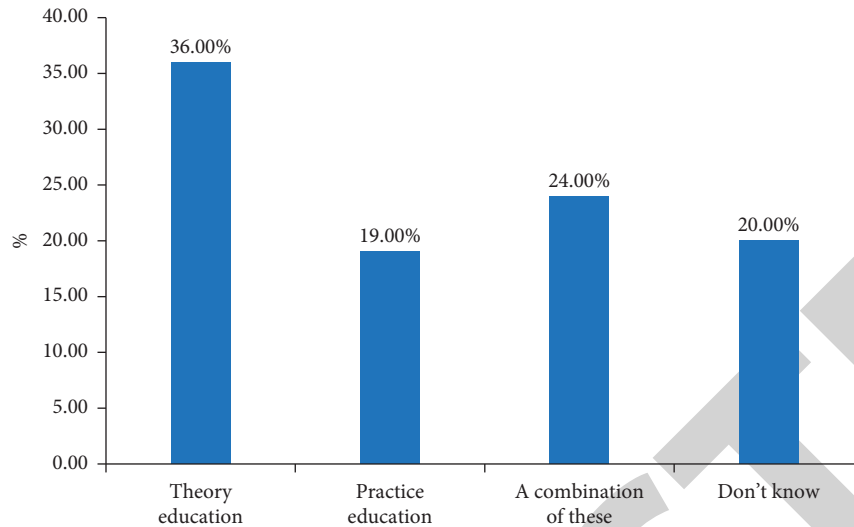
FIGURE 6: Influence of theoretical education and practical education on values.
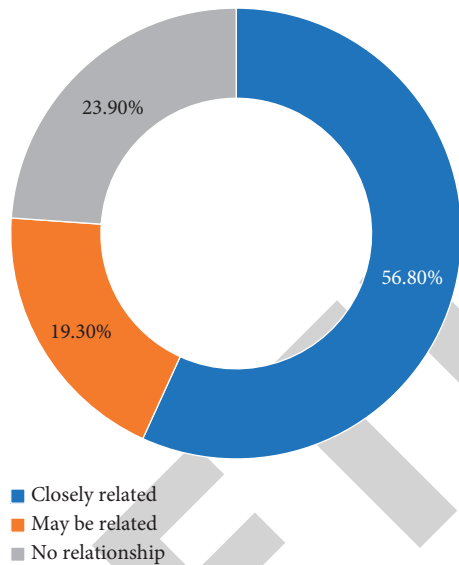
FIGURE 7: Influence of environmental history on college students' political outlook.

3.2. Analysis of the Causes of Environmental History Affecting Education. Education is influenced by environmental history in various aspects, and the reasons are also varied, mainly reflected in the following points:

3.2.1. Environmental History. Firstly, environmental history is permeable, affecting our lives every moment. Secondly, environmental history has secrecy. Environmental history expands the influence of its own ideas through academic journals, seminars, books, and other forms, and spreads its own ideas secretly by means of academic film and television media, which are relatively natural.

3.2.2. Cognitive Ability of College Students. However, college students' understanding of environmental history is still in the primary stage, and they lack the ability of

theoretical analysis, so they cannot use historical materialism to analyze problems. The lack of cognitive ability of college students leads to the influence of environmental history on college students' ideological tendency and behavior to varying degrees. Due to the weakness of basic theoretical knowledge and the lack of rational analysis ability, college students are often affected by the wrong remarks, which poses a certain degree of challenge to their unformed world outlook, outlook on life, and values.

3.2.3. Environmental Changes at Home and Abroad. The environmental history of different regions varies greatly due to their own historical reasons, but with the in-depth development of globalization, Western culture and Western values, especially works advocating Western system concepts, flow into China. They are active in China's politics, culture, academic research, and other fields, imperceptibly affecting the people, especially college students. In the new historical period, the harmonious relationship between environmental histories makes some wrong thoughts and remarks mixed in, and gives rise to a series of wrong theories. College students are vulnerable to the confusion of well-packaged social trends of thought due to their unsophisticated experience in the world, which leads to untruth-based historical cognition and affects the shaping of college students' historical views.

3.2.4. Education and Teaching in Colleges and Universities. College students are the hope of the country, the future of the nation, and the main force of the country's future social development. Good history education is to adjust the behavior of college students, in order to achieve the purpose of the high social identity of college students. Environmental education in schools plays a decisive role in helping students establish the correct three views. The author conducted an investigation on the effect of higher education. As shown in Figure 9, 45.2% of college students believe that the education
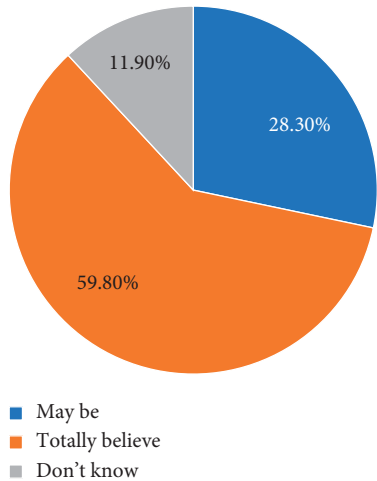
FIGURE 8: Can environmental education shape a better political outlook?
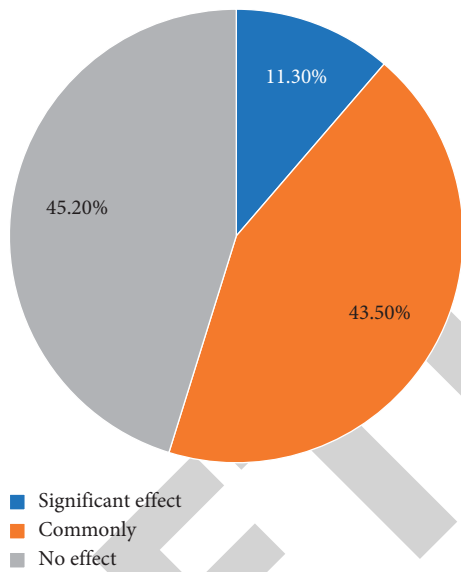
FIGURE 9: Effect of higher education is investigated.

effect of their colleges and universities is remarkable. 43.5% of college students think the education in their colleges and universities is effective, but the effect is just average. However, 11.3% of college students think their education is ineffective.

3.2.5. Influence of Online Social Media. With the continuous development of new online social media, there are inevitably some problems. The improper development of network social media will have a very bad influence on the thoughts of college students and will inevitably hinder the progress of society. At the same time, online social media does not match relevant laws and regulations, resulting in the chaos of online information.

As shown in Figure 10, the question "What are your main channels for obtaining information?" is investigated: 49.8% of students use microblog, We Chat, forums, and
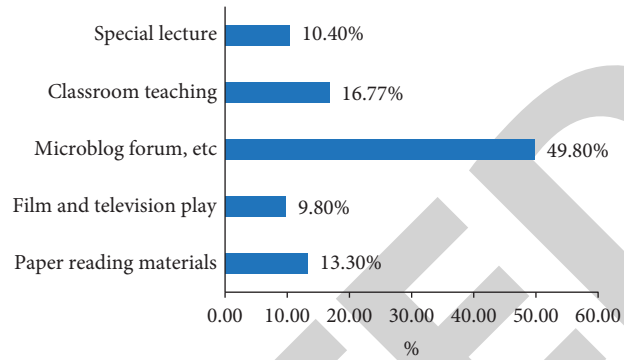
FIGURE 10: Access to information.

other ways to get information; 16.7% students get the information they need through classroom teaching; 13.3% of students obtain relevant information through paper reading materials; 10.4% of the students obtained political information and historical knowledge through special lectures; and 9.8% of the students got to know it through movies and TV plays.

It can be seen that there are various channels for college students to obtain information, but they mainly obtain historical knowledge and political information through network social media. A good network environment for college students to obtain information optimization and about education environment has a great impact.

4. Result Analysis and Discussion

4.1. Research Significance of Educational Environmental History. The history of the educational environment is a cross-research field between educational history and environmental history. Based on environmental history, it is a field of mutual promotion of current educational development, learning environment and social environment by combining environmental education. The in-depth study of the history of the educational environment is of great significance for improving educational environment and promoting social development.

(1) The history of the educational environment observes human educational activities in the process of nature and its vicissitudes, transcending the spatial and geographical boundaries of traditional nation-states. In a broader context, the author gives a new understanding and imagination to the development and evolution of education itself and its interaction with nature, society, politics, economy, and culture. It will open up a new research field for the history of education and further promote the discipline construction and development of the history of education.

(2) The environmental perspective and ecological consciousness of educational environmental history research are the embodiment and adherence of Marxist historical materialism and environmental view. On the one hand, "man himself is a product of

nature, developed in and with his environment." The emphasis of the history of the educational environment on the external environment of education is based on the fundamental premise that "man and his education are part of the whole environment (including the natural environment)," and education is neither born in a vacuum nor can survive alone without "environment." On the other hand, man can adapt and change his environment so that it serves his purpose. Therefore, the history of the educational environment is devoted to revealing the relationship between education and environment hidden in the long history.

(3) The study of educational environmental history conforms to the development frontier of international historiography and the trend of interdisciplinary study of educational history. The development of contemporary international historiography has experienced two turns, from the new social history that pursues objectivity and science to the new cultural history that focuses on subjectivity and philosophy. The global history emphasizes the combination of objectivity and subjectivity, science, and philosophy. In this global historical turn with "holistic consciousness," environmental history has gradually become a "rookie" of historiography, rediscovering the "environmental factors" in history and the interactive relationship between human society and the environment.

(4) The study of educational environmental history is the academic response and responsibility of the subject of educational history to the current environmental problems and the future of human beings. Through the restoration, explanation, and analysis of educational historical facts and educational environment, it helps people to understand the influence of environment on education and the reaction of education to environment more deeply and to understand the historical significance of education in promoting environmental protection and achieving the sustainable development goals. In this sense, the history of the educational environment has its own temperature and is closely related to reality.

4.2. Education Countermeasures.
How to study environmental history correctly: It is necessary for us to strengthen guidance and make college students form the correct three views. Environmental history takes many forms; but if we can see it for what it is, we can see through its false appearance.

(1) Rich theoretical knowledge can reflect the humanistic quality of college students. However, the absence of theoretical knowledge will make college students fall into the whirlpool of unhealthy social trends of thought. The theoretical knowledge of university monks needs to be improved. At the same time, we should establish a scientific view of history.

In the process of learning, we should be good at using the scientific method of historical materialism to analyze. In daily life, it is achieved as far as possible through historical materialism research methods to learn.

(2) College education should carry out activities such as academic research and teaching. By participating in the activities, college students can not only deepen their understanding of the classroom content but also promote their basic understanding of national conditions and party conditions, expand their knowledge, and enrich their theoretical knowledge. College teachers can also know the degree of theoretical knowledge mastered by college students in real time, and provide data reference for later teaching practice content.

(3) Schools should cultivate students' sense of independence. Colleges and universities should perfect education, change teaching methods, improve teaching content, and pay attention to cultivating the independent personality of college students. At the same time, families should improve education, set up a correct view of education, pay attention to cultivating children's ability to think independently, strengthen social education, carry out a variety of activities, cultivate their own awareness of independence, and also need to strengthen self-education, maintain a positive attitude, develop independent thinking ability, and form a complete personality.

4.3. Optimize the Ideological and Political Education Environment.
The positive and healthy campus culture is conducive to the formation of college students' humanistic moral quality. The negative and decadent campus culture will corrupt the formation of three views of college students. It is very important to strengthen the campus culture and create a good campus atmosphere. The promotion of campus culture should carry out various campus cultural activities and, at the same time of improving the campus culture level, enrich the practical activities of college students, so as to enhance the cultural accomplishment of college students and create a good campus atmosphere.

Man cannot live without social environment. There are still many problems in our society at present. Firstly, we must cultivate and practice core socialist values. The socialist core values, which are the concrete application of Marxist theory in China and the concise expression of the socialist core value system, are highly summarized from the three levels of the state, society, and individuals. Cultivation and practice of socialist core values, so that college students form a strong sense of identity, are the premise of forming a good social atmosphere.

4.4. Improve the Construction of Education Team.
College teachers have the most direct influence on college students. Therefore, the quality of teachers should be strictly required

in education. Firstly, teachers' theoretical literacy should be improved. Teachers should constantly strengthen their own theoretical knowledge and update theoretical knowledge in time, and should focus on social hot spots and increase the channels for students to obtain information, from the side to guide students to establish a correct view of history. Secondly, in order to improve the comprehensive quality of teachers, it is necessary to train them. Theory teachers can improve their teaching skills and abilities through training and scientific research activities.

Teacher's professional quality refers to the comprehensive quality formed by teachers in the process of practice, including professional ethics, professional skills, professional behavior, and other aspects. The improvement of teachers' professional quality is very important. The improvement of teachers' quality should have firm faith in the communist party of China. At the same time, we need to have a deeper understanding of Chinese history and a deep affection for Chinese culture. Only in this way can teachers truly infect and influence students, so that they can accept the content in class and gradually form the correct political stance and value direction.

4.5. Improve the Level of Internet Supervision. We should exert the positive function of network communication, release positive and positive information, screen out negative and negative information, clean up the network environment, regulate network behavior, occupy the commanding heights of the network position, and adhere to the correct guidance of public opinion. At the same time, censorship has been stepped up. We should strengthen the review of articles, literary works, movies and television plays, small network videos, and other contents, find problems, and immediately stop and prevent the expansion of the content. We will encourage the publication of excellent literary and artistic works and promote their development and prosperity, and strengthen the Internet supervision. We need to govern, operate, and access the Internet in accordance with the law to ensure that the Internet operates in a sound way on the track of rule of law. In recent years, relevant departments have addressed Internet problems and defined prominent problems by law. It can not only provide the regulatory authorities with the legal basis to control the spread of harmful information but also have a certain degree of deterrence to the publishers of such information.

4.6. Boost and Actively Practice Cultural Confidence. Through practical experience, we can personally perceive the charm of Chinese culture. For example, when attending the revolutionary education base, I can understand the revolutionary history, understand the revolutionary spirit, and strengthen my own ideals and beliefs. We should visit museums, memorials, former residences of celebrities, etc., enrich college students' cultural deposits, enhance college students' cultural identity, firm socialist cultural development direction, and enhance college students' cultural consciousness. Cultural confidence, more importantly, requires us to be full of confidence in our own culture. On the basis of understanding our own culture, we should form a strong sense of identity, love our own culture, and then practice cultural confidence in practical life in twofold: on the one hand, the inheritance of culture, such as the inheritance of excellent classics, traditional festivals, traditional art, in the process of inheritance to improve their own humanistic quality; and, on the other hand, the development of culture, in the process of cultural inheritance to perform timely screening, and then develop and create culture to meet the requirements of the times.

To put it simply, cultural consciousness is the foundation, and cultural confidence is built on the basis of cultural consciousness. The positive practice of cultural confidence is conducive to the self-improvement of culture and the great prosperity of socialist culture. Chinese people's recognition of their own culture is gradually formed in the process of long-term active learning, and cultural consciousness promotes cultural confidence. It is the glorious mission of college students in the new era to boost and actively practice cultural confidence and build a cultural power.

5. Conclusion

This article through to the education and the development of environmental history background, and the exploration and analysis of the history of education environment, combined with the theoretical research by means of the questionnaire survey, analyzed the influence of the history of environment for education, through the analysis of environmental education on college students' view, values, political theory, and the effect of further analysis of the research on the history of education environment. The history of the educational environment, as an interdisciplinary research field of educational history and environmental history, not only sticks to and carries forward the dialectical relationship between man and environment thought of Marxism but also conforms to the frontier of international history and the trend of interdisciplinary research of educational history. It not only has the academic value of promoting the discipline construction of educational history but also has the strong feelings of caring about the global environmental problems and the future and destiny of mankind and the social function of guiding the reality.

Due to the diversity and diversity of environmental history, the study of educational environmental history is still relatively simple. Further study on the history of environmental education can be based on the differences in different cultural and historical environments to carry out diversified environmental education and improve the history of environmental education.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Retraction

Retracted: Analysis of Political Subjective Initiative and the Construction Path of Advanced Education from the Network Community Environmental Perspective

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] W. Zhang, "Analysis of Political Subjective Initiative and the Construction Path of Advanced Education from the Network Community Environmental Perspective," *Journal of Environmental and Public Health*, vol. 2022, Article ID 7034414, 13 pages, 2022.

Research Article

Analysis of Political Subjective Initiative and the Construction Path of Advanced Education from the Network Community Environmental Perspective

Wen Zhang

College of Marxism, Xi'an Jiaotong University, Shaanxi 710049, China

Correspondence should be addressed to Wen Zhang; zhangwen821219@163.com

According to the data of the Research Report on online communities, the current online communities and the interaction between members rely on major platforms. Among them, WeChat has a relatively high degree of use, which can reach 61.1%, followed by self-built apps, which are used by 52.8% and 50.0%, respectively, providing a good communication space for community members. Users' viscosity to the network is increasing, which makes users more dependent on the network. This is undoubtedly a squeeze for politics and advanced education. Therefore, based on the upgrading of education positions, ensuring the effectiveness of education puts forward higher requirements for the construction of education paths in the network community environment. Through the analysis of the topic map of social network public opinion users, models with different dimensions are built, so as to provide an effective theoretical basis for education and ensure the healthy development of online community environmental education.

1. Introduction

Technological progress has promoted social development, but the penetration of the network in various fields of society has also changed people's thinking and way of life. Based on this background, the network community, which has both technical and social attributes, is a micro mapping of the new social form [1]. For the current people, the iterative updating of network community types and how to ensure the concentration of users' thoughts, actively play the role of political and advanced education, and explore the effective path of education from the perspective of the community are of great significance to the current society and the development of the network community. Based on the relationship between individuals and groups, this paper deeply analyzes social relations, discusses the development of social networking, and constructs a guiding mechanism suitable for the collaborative management of users' online communities, which has a practical impact on modern ideological education [2].

The progress of technology is an important driving force to promote the changes of the times and the evolution of social forms. The progress of network technology is not only widely influencing and promoting the innovation and development in various fields of economy and society but also profoundly changing people's living conditions and development methods [3]. The development of network technology has further promoted the interaction between people, and the social structure and form have changed accordingly. As shown in Figure 1, after the increase in the number of Internet users, the Internet is not a technological reform but a revolution in society and human relations. With the progress of scientific and technological means, online communities are becoming more and more developed, and students are more accustomed to contacting, communicating, and receiving educational information through online communities. The education of subjective initiative is also completed through the network to a greater extent. This kind of political education completed by the online community environment is more convenient and promotes low

China's Internet users and Internet penetration
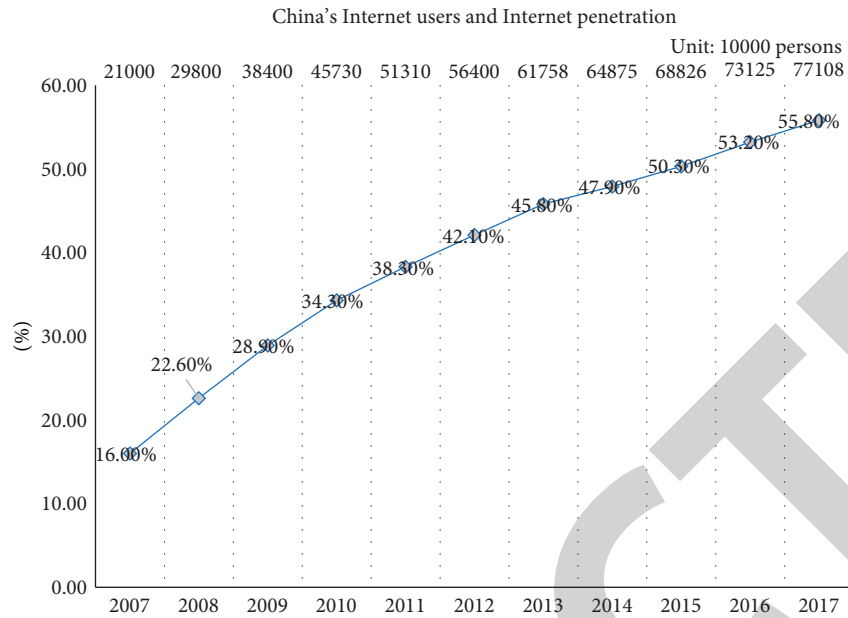
Figure 1: Size of Internet users and Internet penetration in China.

carbon development to a greater extent and reduces the environmental burden.

Facing the ideological and political education and advanced education in the new era, we need to face the connotation characteristics of the network community, so as to investigate the relationship between people and society and accurately grasp the characteristics of the network in the new era. Only in this way can a more effective network-based community be formed to provide users with correct education. In this regard, how can the connotation of online community be understood? How can the group usage on the user network be explored? In the face of the new era of network development, how to accurately grasp the new characteristics and changes of the behavior and thought of educational objects and explore new educational paths is the primary problem we are facing [4]. For a modern society, education in the network era is more conducive to accurately grasp the elements of network development and make effective responses according to its development and change rules. Secondly, it is more helpful to promote the innovation of ideological education practice. It can optimize the content construction of the educatees' online community according to the understanding of the educational objects, so as to promote and optimize the construction of the online community and provide more effective guidance for education.

2. The Spreading Mode and Evolution Mechanism of Knowledge in Network Community

2.1. Definition of Knowledge in the Network Community Environment.
Knowledge is an essential factor in knowledge transmission. Previous researchers defined knowledge as the organization and refinement of the information obtained to solve practical problems, the improvement of personal

ability, and the establishment of personal interaction network. According to the definition of scholars and the background of knowledge development, knowledge refers to the processing and integration of information, data, and other resources, which are applied to the solution of practical problems or the accumulation of personal capital. Compared with the characteristics of common substances that will be continuously lost and depreciated in the case of repeated use, knowledge is a constant value-added in the process of use [5]. Especially in the online community environment, knowledge is spread more widely and shared more frequently, and knowledge shows greater value in the process of superposition and interaction of community members.

2.2. Knowledge Dissemination Mode under the Network Community Environment.
The existence of communication mode connects various elements together. For the current knowledge communication, there are three types: hierarchical communication, tower communication, and network communication [6].

2.2.1. Hierarchical Communication.
As shown in Figure 2, it can be seen that the hierarchical communication mode is divided into different levels. In the process of communication, both the disseminator and the receiver complete the corresponding behavior under the condition of anonymity, but, as a social person, the individual will be affected by both personal and environmental factors in the whole process of communication activities, which will bias his knowledge communication behavior.

2.2.2. The Tower Communication Mode of Knowledge Constructed from the Perspective of the Communicator.
As shown in Figure 3, it can be found that knowledge dissemination in the online community environment is no
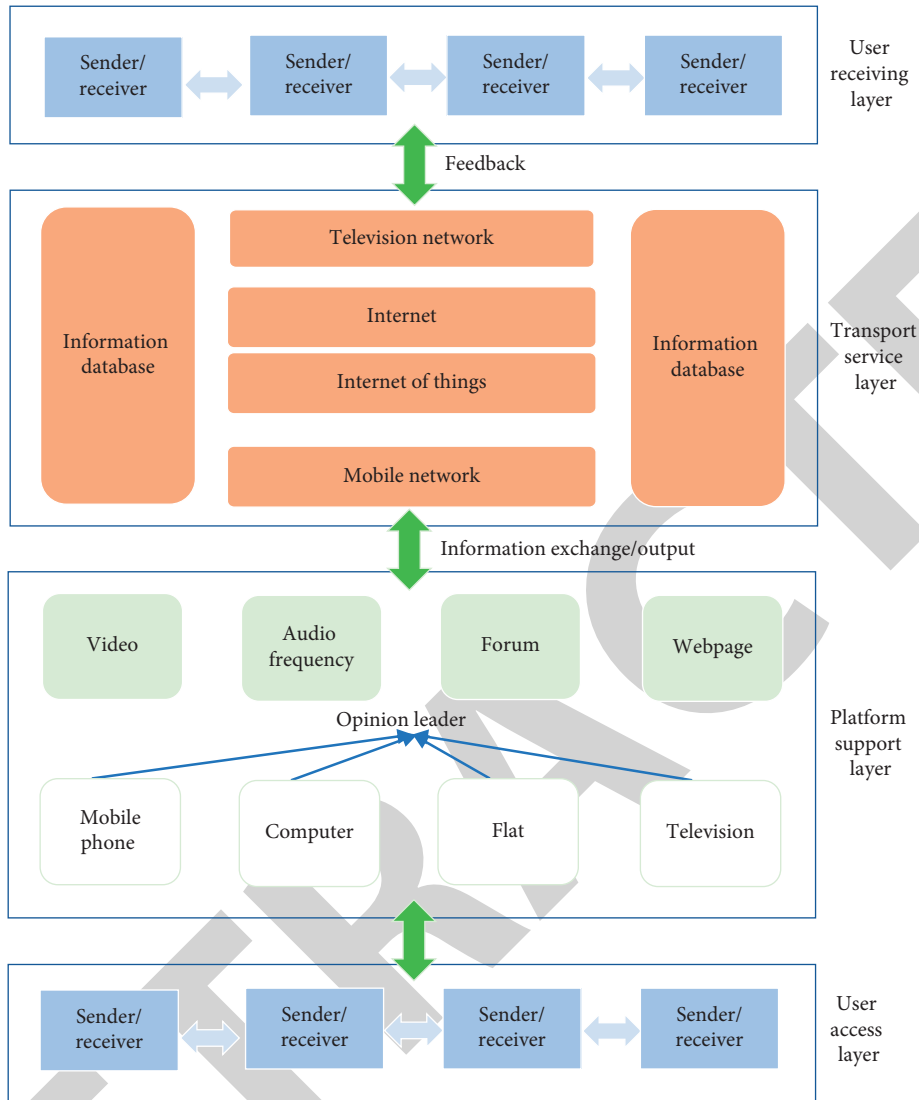
Figure 2: Knowledge level communication mode.
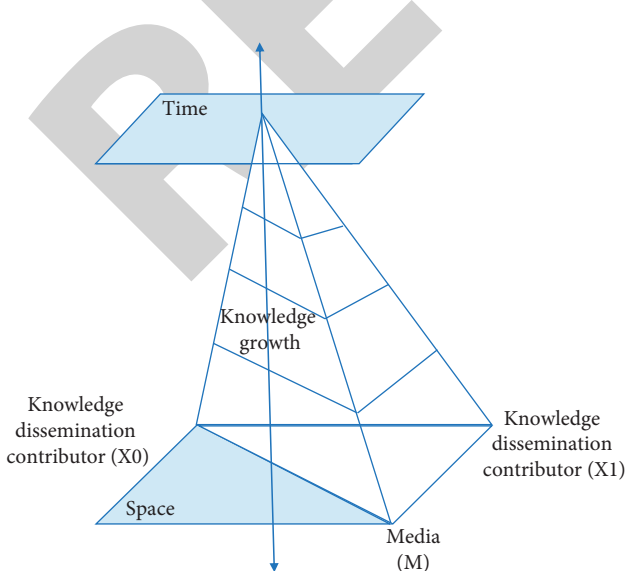
Figure 3: Tower mode of knowledge transmission.

longer limited by time and space, and the boundary between the disseminator and the receiver is eliminated. Therefore, the disseminator and the receiver can be unified as participants in knowledge dissemination, and the positioning of the receiver can be weakened. Building a knowledge dissemination model based on knowledge contribution can also highlight the equality of the knowledge dissemination process. Through the use of more open media, knowledge contributors' contributions to knowledge continue to stack, which also illustrates the expansion of knowledge dissemination in depth in the online community environment [7].

2.2.3. Network Communication Mode of Knowledge Constructed from the Perspective of the Recipient. In the process of communication, different network environments lead to different user knowledge networks. Users will build a knowledge network according to their own needs. Based on the good interaction between individuals in the overall network structure, they can effectively contribute knowledge

to others. Figure 4 shows the network knowledge model. The knowledge dissemination mode in the network community environment has the characteristics of multiple layers and nesting. In this system, there are three types of structural holes, which are, respectively, attached to the three-tier network. The knowledge energy exchange between structural holes ensures the mutual mapping between the three-tier networks and forms a personal knowledge system network through the process of knowledge transmission [8].

2.3. Analysis of Knowledge Evolution Stages in Online Communities.
The online community has low threshold access and strong liquidity. It is an open system. The relationship between members is loose and fragile and will change constantly. In order to maintain the stable and balanced development of the whole system, it needs to inject energy into it continuously. The dissemination of knowledge in the network community will not be a fixed model, and the evolution of knowledge under the framework of this model is also a dynamic process.

First, we need to ask questions based on knowledge formation and select and integrate according to their own knowledge needs to help the whole evolution process be activated. Second, the network community provides an energy storage platform for the evolution of knowledge, so that the value of knowledge will not be exhausted, and knowledge can form a knowledge base through continuous self-accumulation. When the critical point of knowledge spillover occurs, the breadth of knowledge will be deepened and the content branch will be fuller. Thus, a huge knowledge base is formed, and users can collect almost all relevant content in the system by means of retrieval, inquiry, link, or sharing [9]. At this point, the diffusion of knowledge has a great influence on the network community platform and is concerned and discussed by more users, thus gradually entering the next stage. This stage belongs to the peak of knowledge transmission, which can attract extensive attention and discussion, so that the positive and negative views begin to cluster and evolve into the peak. Finally, knowledge in the online community is formed after precipitation and feedback. In this process, the evolution of knowledge did not end but entered a new evolution process through the continuous interaction between users and knowledge, between users, and between users and platforms, so as to ensure the sustainable existence of the vitality of the network community. As shown in Figure 5, the evolution of knowledge in online communities seems complex, but in fact there are certain laws. Only by finding the existing laws can we strengthen the interaction between the platform and users and enter the new knowledge evolution cycle [10].

2.4. Mechanism of Knowledge Dissemination in Online Communities.
The emergence of network community has subverted the previous knowledge communication mode, making the subject of knowledge communication shift. The participation and release, sharing and collaboration, and integrated feedback of knowledge dissemination are integrated into the same platform by the online community, which provides a strong platform support for knowledge dissemination and establishes a personal centered community-based knowledge dissemination mechanism. Through this mechanism, the accessible area of knowledge dissemination is wider, the coverage is wider, and the content of knowledge dissemination is deeper, which improves the efficiency of knowledge dissemination and shortens the knowledge radius among members. As shown in Figure 6, it can be seen that knowledge dissemination is in a circular mechanism, and the structure is relatively stable [11]. Among them, the participation release mechanism mainly refers to the use of personal knowledge to transfer to the organization into organizational knowledge. The sharing and cooperation mechanism is the mutual transformation of knowledge between users and between users and platforms, so as to realize knowledge interaction, cooperation, coconstruction, and symbiosis. The integrated feedback mechanism is to transfer the information provided by users to the community platform for correction and verification or to rectify in the internal organization through collective wisdom, so as to invest in a new round of knowledge participation and release closed-loop process mechanism [12].

3. Social Network Public Opinion User Theme Map System Model

3.1. Composition of Social Network Public Opinion User Theme Community Map

3.1.1. Information Ecological Elements of Social Network Public Opinion User Theme Map.
The social network public opinion user topic map system model is closely related to the information ecology theory, and the knowledge map can visually analyze the elements of the information ecology. This section focuses on the analysis of the four elements of information ecology of the topic map of social network public opinion users, that is, environmental elements, subject elements, object elements, and technical elements. Based on the four mentioned elements, the mechanism of information ecology element model is described [13]. The environmental factors of the social network public opinion user theme map are shown in Figure 7.

3.1.2. Main Elements of Social Network Public Opinion User Theme Map.
The main elements of the topic map of public opinion users in social networks correspond to the informants in the information ecosystem. This refers to public opinion users who use the corresponding information technology to express their views, emotions, propositions, and attitudes by publishing public opinion information in a certain social network public opinion space. In the main elements of the social network public opinion user theme map, the information person classification is represented by ellipse, and the information role classification is usually represented by rectangle. Figure 8 shows the processing flow of the user unit.

Identify the domain of knowledge to model

A knowledge model is established for the knowledge domain

Test whether the knowledge model is logical
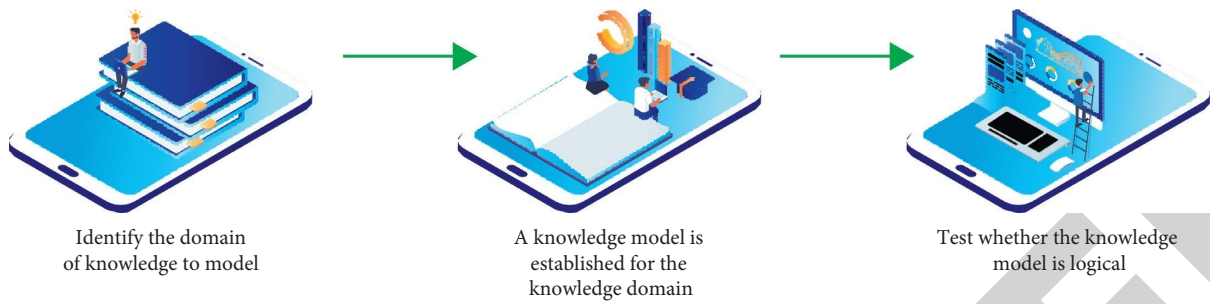
FIGURE 4: Knowledge network model.

Stagnation of knowledge dissemination
Feedback and knowledge formation

Peak of knowledge transmission
Concern and Discussion

Critical period of knowledge diffusion
Forming knowledge base

Early knowledge formation
Ask questions

A consensus could not be reached

Reach a consensus, problem solved
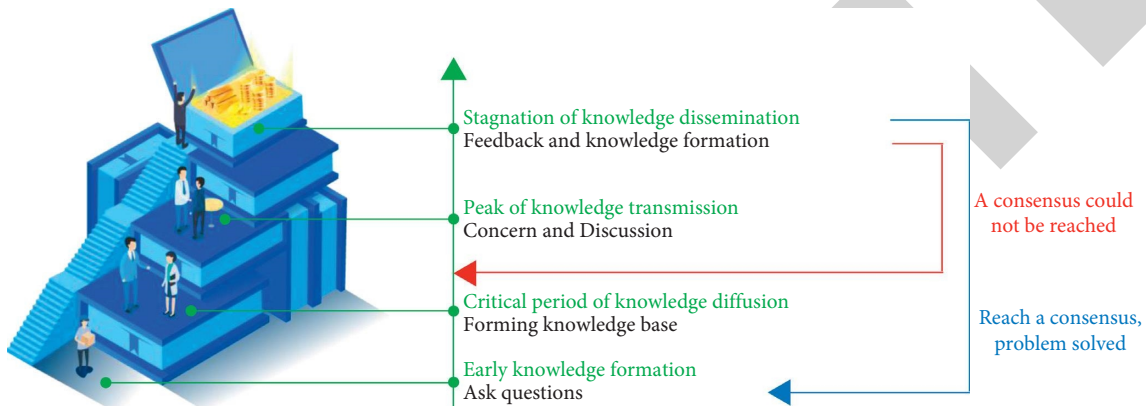
FIGURE 5: Analysis of knowledge evolution stages in online communities.
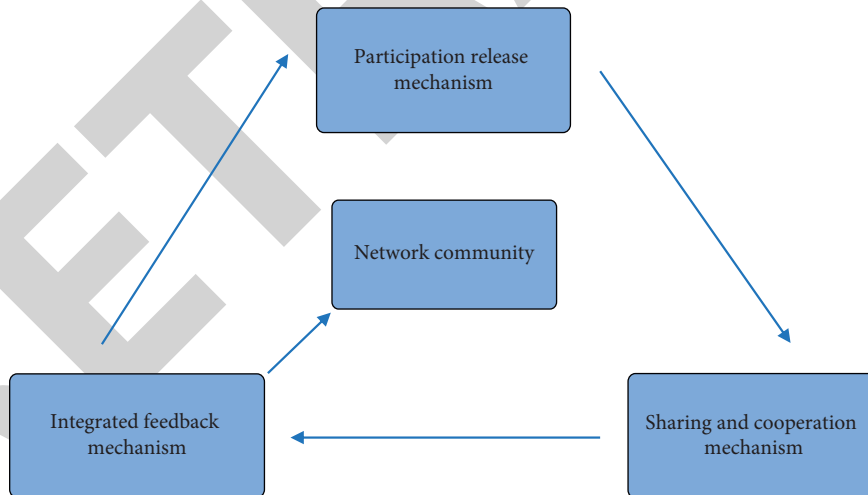
FIGURE 6: Knowledge dissemination mechanism in online communities.

3.1.3. Information Ecological Element Model of Social Network Public Opinion User Theme Map. In the topic map of social network public opinion users, the information environment, informant, information, and information technology together constitute the information ecosystem of the topic map of social network public opinion users. Environmental elements, subject elements, object elements, and technical elements are the four information ecological elements of the theme map of social network public opinion users [14]. The information ecology element model of social network public opinion user theme map is constructed by information technology, as shown in Figure 9.

3.1.4. Construction of Social Network Public Opinion User Theme Map. The entity in the social network public opinion user topic map refers to the basic unit carrying information in the social network public opinion information environment. For its understanding, as shown in Figure 10, according to the attributes and concepts represented by different nodes,
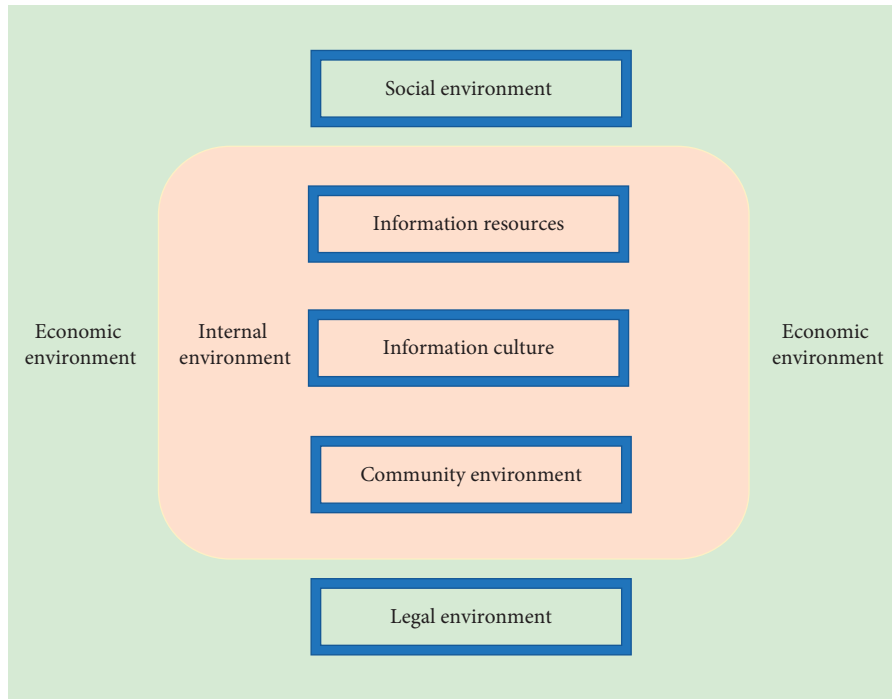
FIGURE 7: Environmental elements of social network public opinion user theme map.
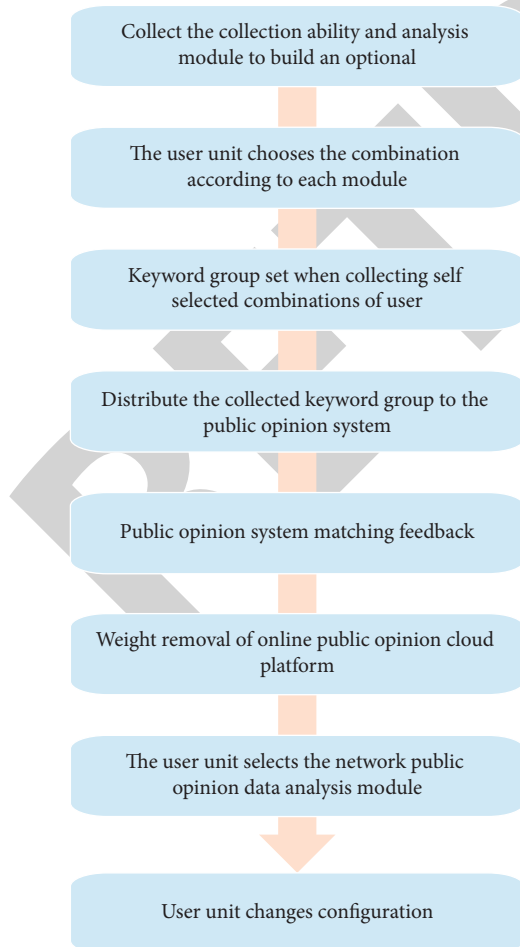
FIGURE 8: User unit's processing flow.

different edges in the graph represent the relationship between different semantics. Each node can have one or more attributes. The identification of user information needs the support of relevant algorithms to solve the redundancy caused by information overload. An effective entity recognition method is the basis for constructing the topic map of social network public opinion users. From the development process of entity recognition technology, the current mainstream methods include rule-based entity recognition method and machine-learning-based entity recognition method, which can also be used in combination [15]. The accuracy of the rule method is high, but it is difficult to achieve because of cost factors, and rule onfa does not have the ability of horizontal migration. Compared with the rule-based implementation, the machine learning method has better robustness and flexibility and does not need too much manual intervention or additional prior knowledge. However, machine learning methods rely on large-scale training data, which cannot effectively solve the problem of sparse data, and some methods have poor convergence [16].

3.2. Composition of Social Network Public Opinion User Theme Map. Based on the relevant theories of information ecology and knowledge map, this paper mainly makes an in-depth study from three aspects: The first is how social network public opinion user topic map contributes to community discovery, user identity, and emotional evolution. The second is that, at the same time, information makes the informant form a certain influence in the information environment. The third is that information technology, as the main technical support, ensures the accuracy, timeliness, and security of information circulation [17].
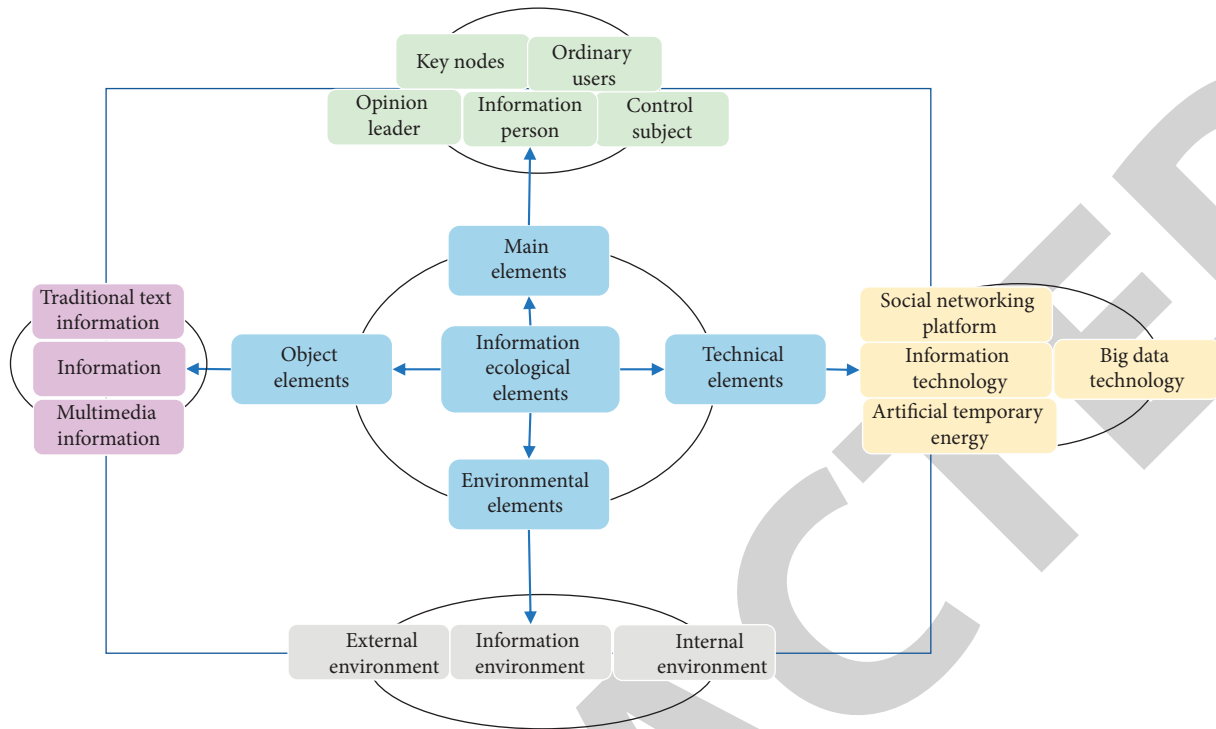
FIGURE 9: Ecological element model of social network public opinion user theme map.
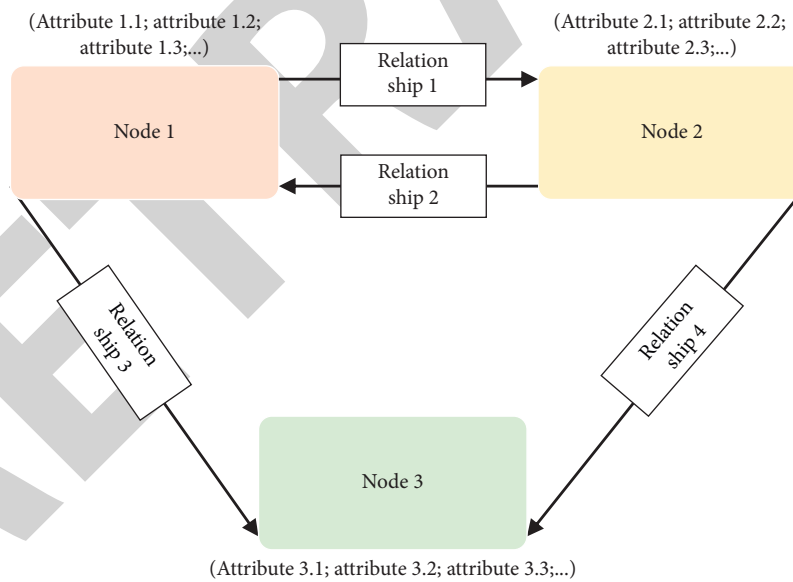
FIGURE 10: Knowledge map < entity relationship > concept map.

3.2.1. Social Network Public Opinion User Community Map. In a specific public opinion space, due to the differences of public opinion users' own information resources and information culture, they will gather into different network communities, thus forming different community environments. Only by combining the agent model can we further understand the user community map, discover the relationship between communities, and effectively identify the user characteristics and other elements [18].

3.2.2. Social Network Public Opinion User Identity Map. Based on the identity and communication characteristics of informants, this paper uses information technology to analyze the life cycle of public opinion and analyzes the process of informants' participation during this period. The user identity is classified and the evolution process is analyzed. Classification algorithm is used for user identification and establishing visual atlas. Different from the static portrait description based on registration information, the

identification of social network public opinion user identity map is based on the analysis of users' public opinion information under different topics, which can intuitively present the public opinion relationship between different users.

3.2.3. Social Network Public Opinion Ecology and Evaluation.

In the research process, according to the analysis, a comprehensive evaluation index system is constructed from the four dimensions of community information environment, users, technology, and emotion to explore the symbiotic law between various elements. The relationship among environment, subject, object, and technology in social network public opinion is effectively interpreted. The ecological nature of social network public opinion mainly studies the systematic law of the interaction of ecological constituent elements and observes whether there is a positive interaction between different constituent elements and whether it promotes the benign operation of the whole ecosystem. The ecological evaluation based on the user theme map of social network public opinion has changed the traditional analysis method of social network public opinion and information ecology. By analyzing its ecological evolution logic, it is clear that the long-term and stable development of social network public opinion ecology depends on the interaction of its participating elements under certain time and space conditions, as shown in Figure 11 [19].

Horizontally, the public opinion space corresponding to the information environment can deeply mine the network community in the space. Information corresponds to public opinion information, and the emotional tendency of public opinion information can be analyzed through the user's emotional map. Vertically, the information environment includes the informants in the environment, and each informant is the direct producer of information, which is a research process from macro to micro level. Public opinion space contains different public opinion users, and public opinion users are the main providers of public opinion information in the public opinion space, which is a research process from the whole to the specific [20].

4. Social Network Public Opinion User Community Map Construction and Community Discovery

Based on the theory of information ecological environment, combined with the LDA theme model of JS divergence, the social network public opinion user community map is constructed, and the community relationship is found. Based on social topics, the user's theme preference is analyzed. User community map is used to identify user characteristics.

4.1. Raising Problems.

With the increasing popularity of the network, users' information interaction in the network community becomes more frequent. The network is made to become an amplifier of social public opinion. On the other hand, traditional analysis methods mostly use calculation indicators for identification, resulting in the inundation of small-scale communities. By constructing the social network public opinion user community map, we can tap the potential themes of the community, divide the network community, and determine the community theme preference. It is the key to ensuring the coordinated development of public opinion and plays a certain guiding and reference role for public opinion supervision [21].

4.2. Social Network Public Opinion User Community Discovery Model

4.2.1. LDA Subject Model.

Latent Dirichlet allocation (LDA) is a generative model, which is essentially a multilevel Bayesian probability graph model. This probability graph model contains three granularity structures: document, topic, and word. The core idea is that each document corresponds to a word that obeys the Dirichlet distribution $\overline{\theta}$, and each topic corresponds to a word that obeys the Dirichlet distribution $\overline{\phi}$, where the document topic distribution α parameter and the topic word distribution β parameter obey the Dirichlet distribution and $\overline{\alpha}$ and $\overline{\beta}$. In the field of machine learning, the topic model plays an important role. The optimal number of topics is determined through the confusion evaluation index. The formula is as follows:

$$\text{perplexity} n \ Dn = \exp \frac{\sum_{d=1}^{M} \log nW_d n}{\sum_{d=1}^{M} N_d} n \ln , \qquad (1)$$

where D represents the set of all words in the document, M represents the number of documents, W_d represents the words in document D, N_d represents the number of words in each document, and $P\ (W_d)$ represents the probability of words in the document. The degree of confusion generally decreases with the increase of the number of potential topics. The smaller the degree of confusion, the stronger the ability of the topic model. Therefore, this chapter selects values with relatively low confusion and relatively small number of topics as the optimal model parameters for LDA topic model training.

4.2.2. Similarity Measurement.

After obtaining the optimal number of topics through the confusion degree, the document topic distribution can be obtained through the LDA topic model. After obtaining the document topic distribution matrix, this chapter uses JS (full name: Jensen Shannon divergence) to calculate the topic similarity between users and uses it as the edge weight in the construction of community map. JS divergence measures the similarity of two probability distributions and is a variant of KL (full name: Kullback-Leibler divergence). Since KL divergence is not symmetrical, it is not conducive to the construction of downstream community map. JS divergence effectively solves the problem of asymmetric KL divergence, and its value is between 0 and 1 [22]. The calculation formula is as follows:
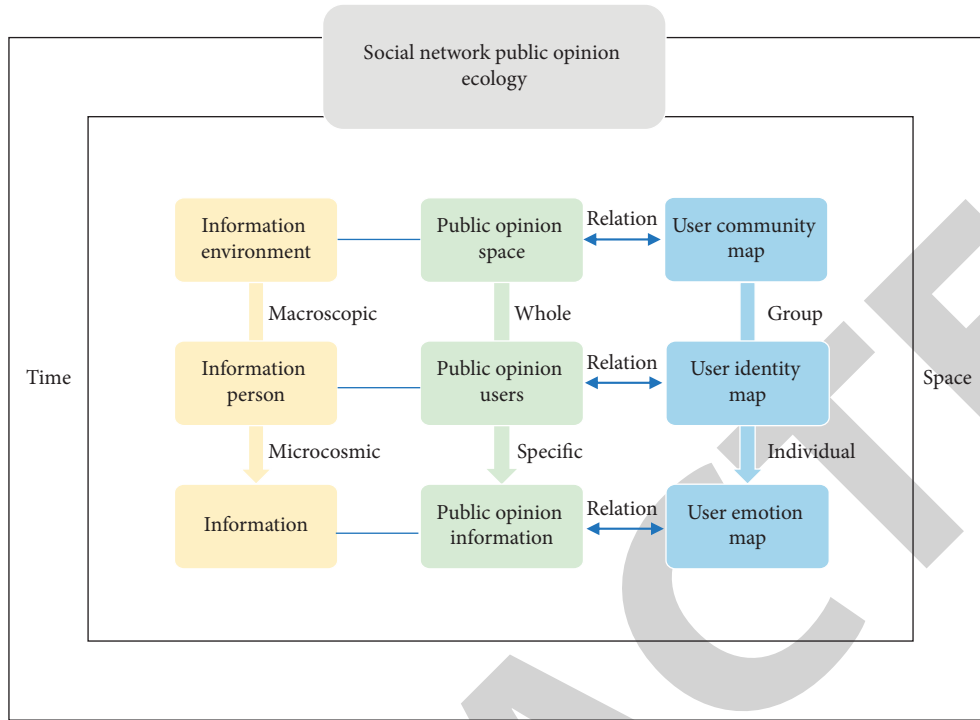
FIGURE 11: Ecological evolution logic of social network public opinion user theme map.

$$JSnP\|Qn = \frac{1}{2}KLnPnxn\| \frac{Pnxn + Qnxn}{2}$$

$$+ \frac{1}{2}KLnQnxn\| \frac{Pnxn + Qnxn}{2}nn2n, \qquad (2)$$

$$KLnP\|Qn = \sum Pnxn \log \frac{pnxn}{Qnxn}n3n.$$

In the above formula, $P(x)$ and $Q(x)$ represent the probability distribution of users with different public opinions, that is, the document topic distribution obtained by LDA topic model. If there are m pieces of user information, the topic distribution is $m * n$, and a square matrix of $m * m$ is obtained to obtain the division of public opinion users. Through this similarity measure, we can find the nearest neighbor user set and determine the network community in the information environment [23].

4.3. Construction of Social Network Public Opinion User Community Map Model. Social network public opinion user community map is built based on LDA topic model. The user community map model built in this chapter is shown in Figure 12. After the JS divergence is calculated, the user community map is constructed with the public opinion users of the common theme as the node and the JS divergence as the edge weight information, and the network community is divided and the corresponding characteristics of the community are analyzed.

4.4. Data Collection and Analysis. In this chapter, Python is used to collect the keywords published by public opinion

users according to the content shown in Figure 13. The advanced search function is used to crawl all pages in a request and store them. XPath parsing is used to obtain user related information. Jump to the next level request according to the time when the text is published [24].

After data processing by access and excel, the invalid fields and contents in the data are normalized to make the text topic incline towards a more original direction. To determine the optimal topic, we need to train the text classification after processing. The integer within the range of 2 to 30 is proposed as the number of topics, and the logarithm confusion value of different models is obtained by calling the log_perplexity method under the LDA topic model class, as shown in Figure 14. The horizontal axis in Figure 14 shows the number of potential topics in the LDA topic model, and the vertical axis shows the confusion degree of the LDA topic model. The broken line in the figure shows that, as the number of topics increases, the overall degree of confusion shows a fluctuating upward trend. The local minimum of confusion degree appears in the model selection with the number of topics being 7. According to the Occam's razor criteria mentioned above, and in order to ensure that the model covers differentiated topics as much as possible, this chapter intends to select 7 as the topic parameter value of LDA topic model.

After the optimal topic is selected, the text data needs to be processed. The distribution of each topic is shown in Table 1.

As can be seen from Table 1, the probability values of keyword occupation of each topic are relatively large, which conforms to the characteristics of the text topic. Even if users have different comment habits, they can also divide topics by
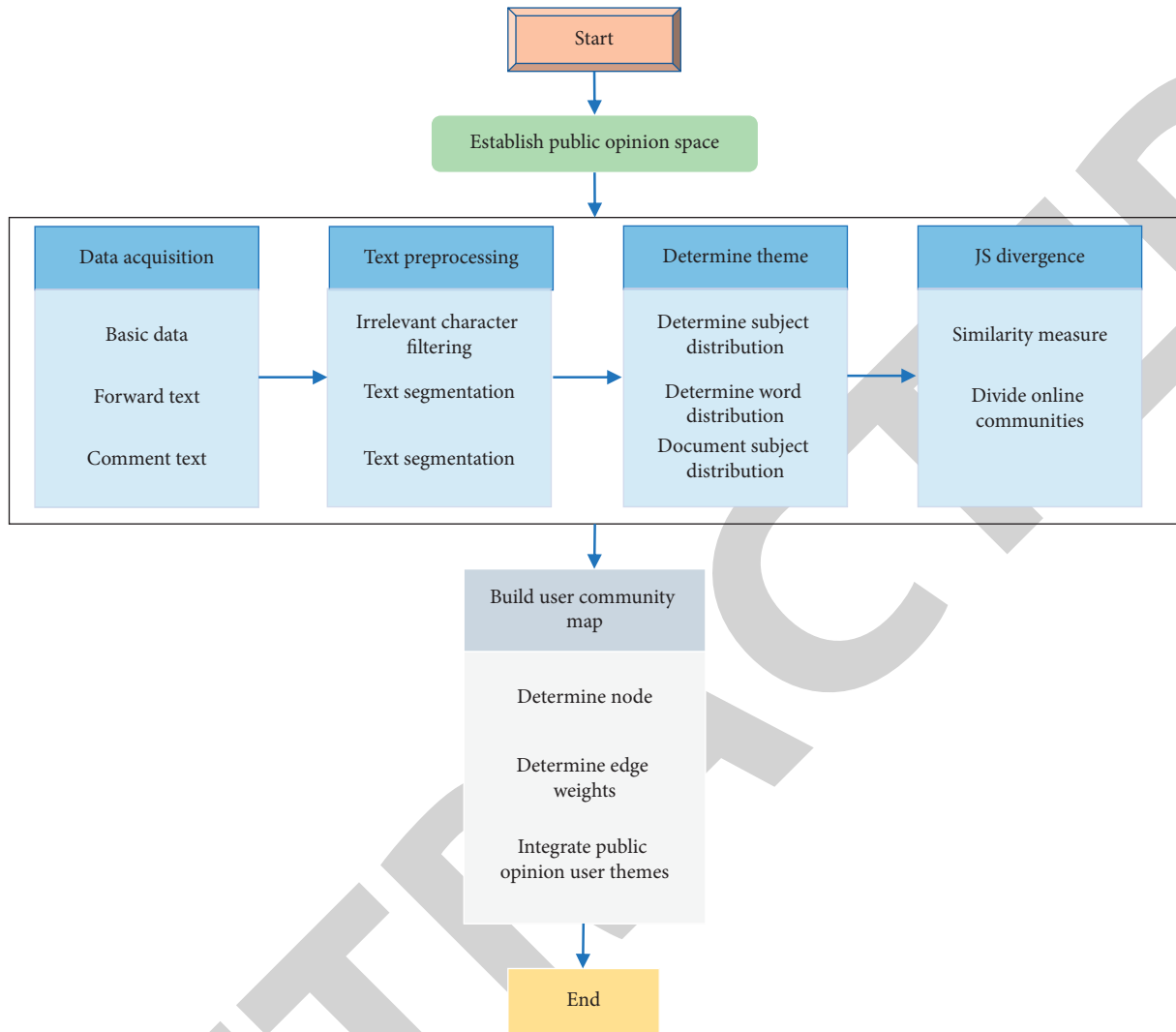
FIGURE 12: Social network public opinion user community map model based on the LDA topic model.
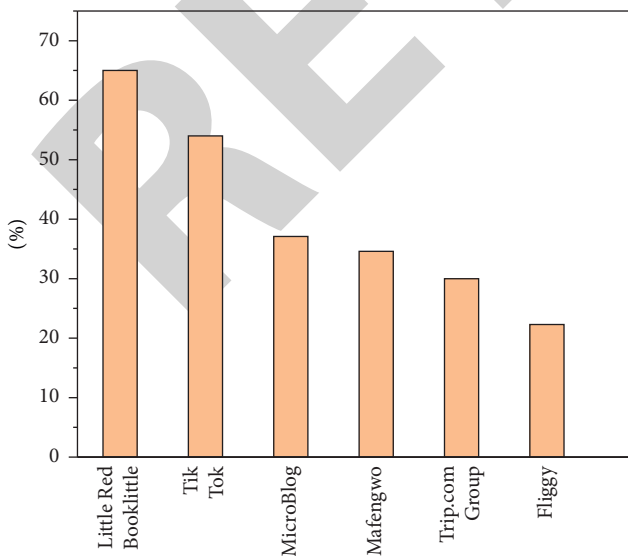
FIGURE 13: User publishing content and platform.
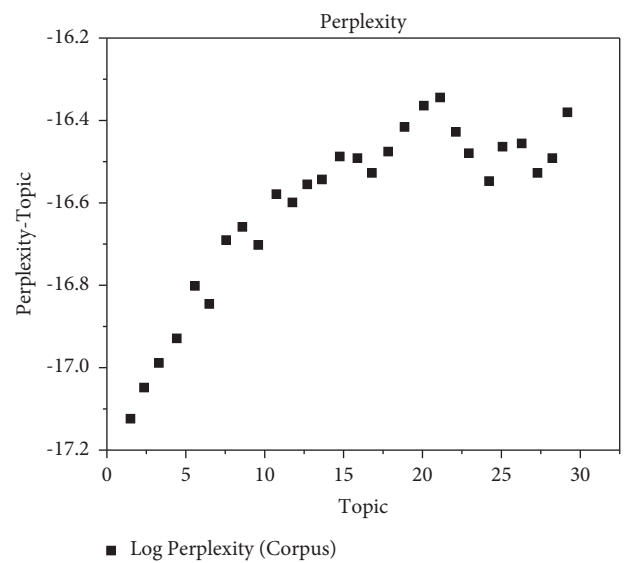
FIGURE 14: Line chart of permeability topic.

TABLE 1: Distribution of clustering subject high frequency words.

Subject 0	Pilot	Crash	Release	Ethiopia	Responsibility
Probability	0.0.31	0.022	0.021	0.042	0.032
Topic 1	Grounded	Fault	Publish	China	Global
Probability	0.038	0.032	0.016	0.013	0.012
Topic 2	Photo	Passport	Staff	Accident	Information
Probability	0.028	0.026	0.015	0.016	0.016
Topic 3	Publish	Video	Status	Rummage	Maneuver
Probability	0.027	0.024	0.021	0.020	0.019
Topic 4	Press conference	China Eastern Airlines	Air China	Relics	Girl
Probability	0.044	0.036	0.036	0.030	0.020
Topic 5	Boeing	System	Defect	Aircraft	Aircraft
Probability	0.062	0.039	0.039	0.038	0.037
Topic 6	Family members	Victim	Prosecution	Dead	Remains
Probability	0.019	0.016	0.017	0.015	0.015

model. It can be found that most public opinion users' forwarded comment texts have obvious topic division, and the topic tendency of public opinion users can be effectively mined through LDA topic modeling.

4.5. Social Network Public Opinion User Identification Model. The sampling process of LDA subject model should follow the core idea of Dirichlet model. That is, assuming that M pieces of microblog public opinion information are collected, totaling n words, and the number of topics of microblog information is k, the sampling process of LDA topic model is as follows: select a parameter according to the collected topic distribution, and generate N keywords according to the steps. The keywords are assigned according to the parameters and distributed to the corresponding topics. Thus, according to the distribution of randomly generated topics, the generated words are obtained.

In order to better control public opinion, most microblog platforms have introduced the identity discrimination dimension, so that the algorithm can realize the identity screening mechanism. The user identity needs to be authenticated. The user identity features are

$$\text{Identity} = \text{verify} + \log ne^{\text{follower}-\text{following}} + e^{\text{num}}n. \quad (3)$$

"Verify" indicates whether the user has passed the authentication mechanism of the microblog platform. "Follower," "following," and "num" are the number of fans, followers, and tweets, respectively. Z-score normalization is required before the formula is brought in. The formula is $Z = (x - \mu/\sigma)$, where x is the characteristic value to be specified, μ is the mean value, and σ is the standard deviation.

The construction of communication features is defined as follows: propogatinon = $\log ne^{\text{follower}} + e^{\text{repost}} + e^{\text{comment}}n + \text{like}$, where "follower," "repost," "comment," and "like" correspond to the number of followers, forwarding, comments, and likes, respectively, and the value is obtained after Z-score normalization. The promotion value is proportional to its propagation ability. The larger the value, the stronger the propagation ability.

4.6. Naive Bayesian Classifier. As a generative model, naive Bayesian classifier estimates the posterior probability from the prior probability based on the assumption of attribute conditional independence and Bayesian formula. Information D is abstracted into a word bag model, which is a document composed of n words w, defined as $D = \{w_1 nw_2 n \ldots nw_n\}$, and the user category belongs to $C = \{c_1 nc_2 n \ldots nc_n\}$. Based on the assumption of attribute condition independence, the user identity classification calculation should be $c_{NB} = \arg \max Pnc_j n \prod_{i=1}^{n} Pnw_i | c_j nc_i$. The prior probability of $Pnc_j n$ user category can calculate the known information. Based on the given category conditions, the conditional probability is calculated such as the formula $Pnc_j n = (\text{Doc}nc_j n / \sum_{c_j \in C} \text{Doc}nc_j n)$. The posterior probability is calculated as follows:

$$Pnw_i nc_j n = \frac{\text{Weight}nw_i nc_j n}{\sum_{i=1}^{n} \text{Weight}nw_i nc_j n}. \quad (4)$$

It should be noted here that when category C_j in the text is missing, the calculation result is 0. In view of the limited amount of information and the difficulty in forming a sample space, the formula is improved to eliminate the negative impact of the 0 factor, and the formula is improved to

$$Pnw_i nc_j n = \frac{\text{Weight}nw_i nc_j n + \delta}{\sum_{i=1}^{n} \text{Weight}nw_i nc_j n + \delta |V|},$$

$$V = \sum c_j \in C \sum_{i=1}^{n} \text{Weight}nw_j nc_j nn\delta = \frac{1}{|V|}. \quad (5)$$

4.7. Overview of Public Opinion Events and Cycle Division. In order to better divide the public opinion life cycle, it is necessary to analyze the node event probability of information. As shown in Table 2, according to the time stage, the event cycle can be divided into three cycles: outbreak, spread, and recession. According to the characteristics of the event, the topic heat increases. After the user's participation, the topic gradually enters the recession period. It can be seen

TABLE 2: Event probability of key event nodes.

Time	Key events
2019/03/10	Cause the accident
2019/03/12	News release from multiple countries
2019/03/14	Arrival of relatives of the victims of the accident
2019/03/29	Investigation report released
2019/04/12	Official response

from the classification results of social network public opinion users' identities that, according to the statistics of user identity types, the participation process of various types of public opinion users can be mastered. Media public opinion users have a high degree of participation in each public opinion life cycle and have the right to speak about most public opinion topics. Public opinion users in the aviation industry have significant participation at most key time points but quit the discussion during the recession. The participation of relevant enterprise nodes in Manyan is high, which once exceeded that of the media. The participation of ordinary people in the whole life cycle of public opinion has been relatively stable.

5. Conclusion and Prospect

Under the background of network community, the era of community has been formed in the process of political initiative and Progressiveness Education and in the network technology of weeding out the old and bringing forth the new. Looking back at the rise, formation, and development of online communities, there is no doubt about the crucial importance of technology driven, but it is not the only decisive factor. This research has always been guided by the awareness of the above problems, placed the research under the macro background of information technology reform, the rise of the network society, and human survival and development, followed the research philosophy of "technology human (individual group)—society," and made every effort to conduct a multiangle and multidimensional investigation on the intrinsic connotation of the network community and the deep-seated causes, internal and external drives, and value significance of the formation and development. It brings some enlightenment for the ideological and political education to explore the appropriate response path and highlight the vitality in the online community.

This paper attempts to explore and put forward some practical paths for ideological and political education to integrate into the network community and play an educational and guiding role in the network community, starting from the objective dimensions of enhancing the embeddedness, communication, and guarantee of the network community of college students' ideological and political education. However, due to the sustainability of technological innovation and social change, in order to promote the effective "implementation" of relevant measures in practice and give full play to the vitality of political education in online communities, it is still necessary to continuously

track and refine research in combination with practice. This also provides the impetus for the author to continue to carry out in-depth and expanded research around this topic and field in the future.

Data Availability

Conflicts of Interest

Acknowledgments

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Retraction

Retracted: The Dialectic and Coupling of Three Paradigms in the Process of Art Rural Construction: Environment, Culture, and Industry

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] X. Fan and X. Zhong, "The Dialectic and Coupling of Three Paradigms in the Process of Art Rural Construction: Environment, Culture, and Industry," *Journal of Environmental and Public Health*, vol. 2022, Article ID 1864916, 9 pages, 2022.

Research Article

The Dialectic and Coupling of Three Paradigms in the Process of Art Rural Construction: Environment, Culture, and Industry

Xiaoying Fan[1] and Xianghu Zhong [ID][2]

[1]School of Art, Southeast University, Nanjing 210000, Jiangsu, China
[2]College of History and Culture, Hubei Normal University, Huangshi 435002, Hubei, China

Correspondence should be addressed to Xianghu Zhong; zhongxh928@hbnu.edu.cn

The development and construction of cities and villages are a complex process jointly promoted by multiple subjects such as government, residents, enterprises, planners, and community elites. Through the summary and analysis of the practice of art rural construction at home and abroad, it is found that its events show three main paradigms in the development process. The environmental creation paradigm reconstructs the environmental semantics of the countryside through the creation of environmental art works, showing the remarkable characteristics of "the presence of works." The cultural revival paradigm maintains the local culture through cooperation with residents in art and has the characteristics of "de-artization " and "de-heritage." The industrial development paradigm adjusts the industrial structure through the production of commodity art to achieve the improvement of the rural economic foundation. Under the new development trend, the three paradigms are gradually converging.

1. Introduction

Since the 1950s, art intervention in rural construction (referred to as "art village construction") has gradually become a global cultural phenomenon. In the current art rural construction, artists intervene in rural construction in the form of art, so that "artists" can become the planners and implementers of rural construction and so that "art" can become a new resource of rural construction. Its goal is to activate rural culture, promote village revival, and rebuild the relationship between people and art, so as to explore various possibilities of rural revitalization, urban-rural integration, and village protection and development. And a large number of successful cases have emerged, such as the village of Akumedia in Italy; the village of Fiska in Finland; the village of Fiska in Poland; Salipa village, Echigo-Tsumari Area in Japan; and Gamcheon-dong village in Korea [1]. In the past decade or so, "artistic rural construction" has also become a common practice in China, and it has become an important way to revitalize the countryside with culture. Sex

and other issues were discussed in depth, and a certain consensus was reached [2]. Nowadays, China is paying more and more attention to rural development. However, the development and construction of cities and villages are a complex process jointly promoted by the residents, enterprises, planners, community elites, and other subjects [3], as shown in Figure 1. The decline problem faced by rural areas in the process of urbanization has created many typical cases of art village construction and also achieved a boom in art village construction [4].

Through the summary and analysis of the domestic and foreign art village construction practice, it is found that its events present three main paradigms in the development process [5] as shown in Table 1. The environmental creation paradigm reconstructs the environmental semantics of the countryside through the creation of environmental art works, showing the distinctive feature of "the presence of works"; the cultural revival paradigm maintains local culture through cooperative art with residents and has the characteristics of "de-artization" and "de-heritage" [6]. The
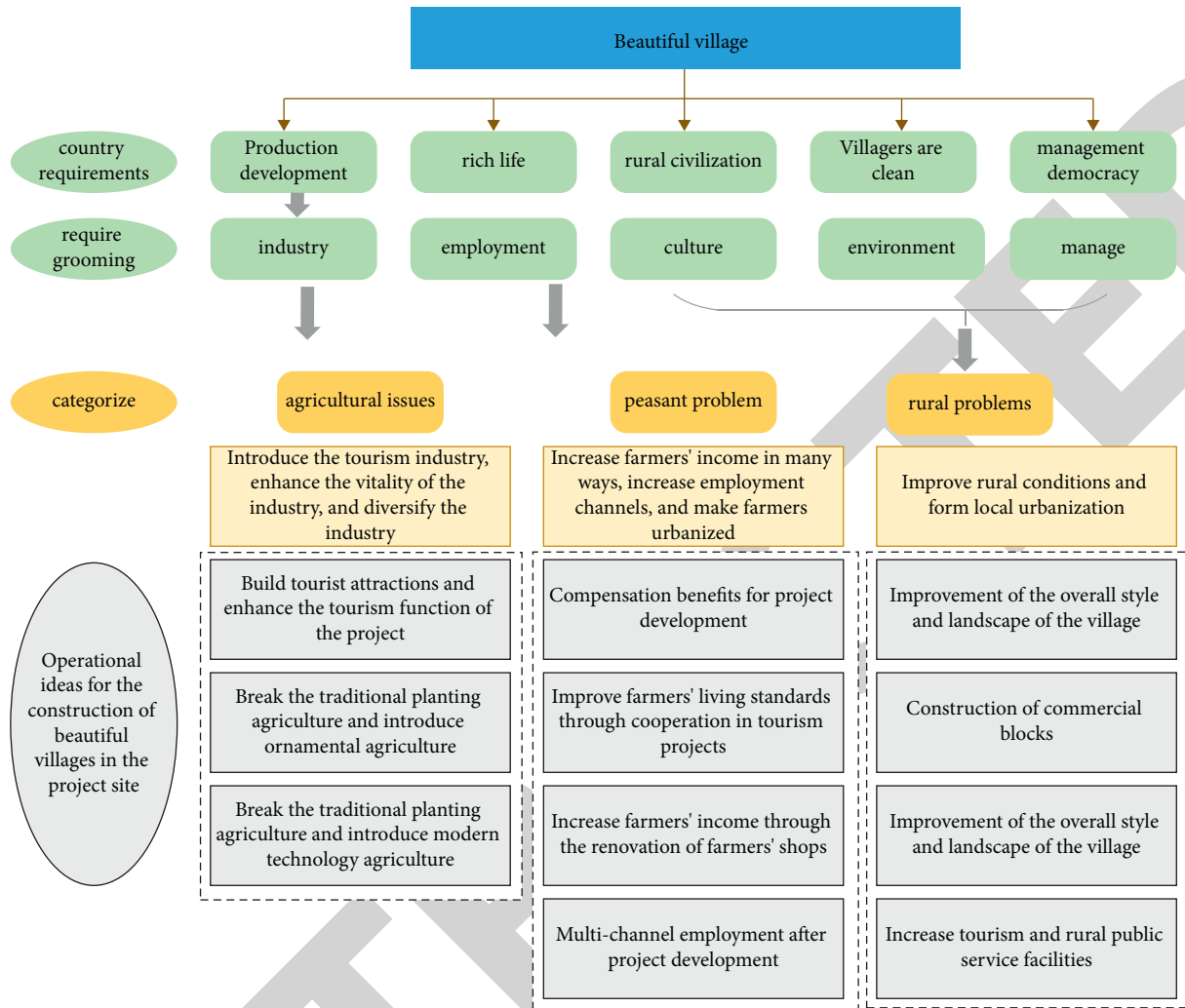
FIGURE 1: The construction framework of the art township construction.

TABLE 1: Comparison of the characteristics of the three main paradigms of art village construction.

Type	Environment creation paradigm	Cultural revival paradigm	Industrial development paradigm
Features	"Presence of works"	"De-artization," "de-heritage"	Adjusting the industrial structure through the production of commodity art, and realizing the improvement of the rural economic foundation

industrial development paradigm adjusts the industrial structure through the production of commodity art and realizes the improvement of the rural economic foundation; the main construction content is as shown in Figure 1. Under the new development trend, the three paradigms are gradually moving toward integration [7].

Through the summary and analysis of the practice of art village construction at home and abroad, this paper compares and analyzes the characteristics of the three paradigms of art village construction and puts forward corresponding suggestions on the path selection of "art village construction." This paper has great practical significance for promoting the construction and development of art village.

2. State of the Art

2.1. The Development Process of Art Village Construction. The early public art did not establish a connection with the countryside but appeared in cities, especially large cities, such as the cities that prevailed in the United States and European countries in the middle of the twentieth century, and then spread around the world [8]. In the new era of socialism with Chinese characteristics, China is committed to narrowing the gap between urban and rural dual structures and accelerating the pace of rural revitalization. Some artists have stationed themselves in the countryside and actively carried out art rural construction practice projects,

which provide vivid practical cases for art to intervene in local creation and promote rural revitalization, but the research on the phenomenon of local creation in academia is relatively lagging behind. Due to the readjustment of the industrial structure in the new era, the loss of population in the process of urbanization, or the backward productivity and other problems, the social, economic, cultural, environmental, and other aspects of rural areas also have a relatively prominent decline [9]. Especially for countries where traditional farming culture has penetrated into the marrow of regional civilization, the development of public art in the new era has rapidly spread from cities to villages, becoming an important opportunity for rural revitalization [10]. In this new period, the development of public art pays more attention to the community, and the impact of art on rural development has become more diverse, complex, and profound. With the help of the rural turn of public art in objects and the anthropological turn in the way of thinking, the phenomenon of artists' involvement in rural construction has been very active in the past 20 years and even has the potential to form an art rural construction movement [11].

The practice of art village construction does not happen overnight, and it has shown a certain continuity and development around the world [12]. The mountain village of Valloria, on Italy's Mediterranean coast, faced hollow decay in the 1990s due to population loss [13]. Several returning young people spontaneously set up an organization named after the famous local scenic spot "Three Springs," put forward the idea of "Opening Your Heart," and invited artists to use the door panels of every household in Valloria as canvases to create [14]. The strong creative atmosphere quickly stimulated the exhibition and sales of a number of cultural and creative products such as ceramic glass products, textile design, and jewelry design. Under the influence of artists, the government decided to build Bornholm into a center for handicrafts, promote the establishment of the Arts and Crafts Association Bornholm (ACAB), organize international handicraft exhibitions, and supervise the quality of handicraft products, making them integrated with the local tourism industry [15].

Influenced by the long and heavy agricultural civilization, there are more practical cases of art village construction in Asia [16], as shown in Table 2. As a result, agricultural productivity was greatly reduced, and private houses and schools were once vacant [17]. By holding the art festival, the local area has realized the transformation from the traditional agriculture to the cultural tourism industry and has also set up a demonstration of "artistic revitalization of the countryside" in the world [18]. In South Korea, in the middle of the last century, immigrants from civil war gathered in Gamcheon-dong and built a large number of shantytowns. Since the 1980s, due to the deterioration of living conditions and architectural style, Gamcheon-dong has been left with the impression of a chaotic and backward area [19]. In 2012, Tugou village put forward the construction goal of "Rural Art Museum," treating the entire village as an open-air art museum to build, from point (art collection display), line ("village house art exhibition" connecting settlements), and

surface (Earth art of idyllic sowing), three dimensions to realize the artization of rural environment, as shown in Figure 2.

Yin Aimu listed many rural art intervention projects since the 21st century and proposed that the construction of art townships should combine local characteristics and develop rural industries. Li Qin analyzed the case of art intervention in rural construction in Yuanyang, Yunnan province, and believed that the creation of "Haneva" in the process of Yuanyang art township construction reflects the local nature of art intervention, so it can stimulate the emotions of villagers and gain their recognition. In most regions, art township is playing an increasingly important role in exploring China's new urbanization and urban-rural relations.

3. Method

3.1. Path Selection of "Art Village Construction". The forms and media of art intervention in rural construction need to be adapted to local conditions, and the methods used for different terrains, cultural backgrounds, and customs are different. It should be closely combined with the actual needs and actual conditions of local residents, and appropriate forms of intervention should be chosen according to local conditions to achieve the purpose of art to help rural revitalization. Meng Fanxing and Kang Zenan proposed that there are three main paths for art to intervene in rural construction, namely, cultural protection, landscape reconstruction and space production, and subjectivity reshaping. This is specifically shown in Figure 3. Xurui also summarizes three paths: one is to hold large-scale art festivals, the second is to restore the social and cultural ecology, and the third is to attract urban people to settle in the countryside and build them together [20].

The first path of "artistic village construction" is to hold large-scale art festivals. The "Xucun Plan" and the "Qingtian paradigm" proposed later have explored extremely valuable experiences in the construction of China's rural art culture. Xucun is a remote mountain village in Heshun county, Shanxi province, where the artist Qu Yan has been stationed for ten years. Through the early investigation of the history and culture, customs and habits, and terrain and landforms of Xu village, he gradually sorted out the "Xu Village Plan" into shape. The worship of land gods is popular in the Xucun area, so Qu Yan held the first Xucun International Arts Festival in 2011 with elements such as the "Stove Fire Festival" and the Land Temple as the starting point to preserve and revive folk customs. The second edition of the festival was named after "Return of the Soul" and aimed to inherit the culture of the local ancestral hall. So far, the Xucun International Arts Festival has been successfully held five times.

The second path of "artistic rural construction" emphasizes the overall restoration of rural society and cultural ecology. Its basic strategy is to "dress and cap" the houses of the entire village first and then hold various curatorial events, including art festivals, rather than to mainly focus on art festivals. This model often pays more attention to

TABLE 2: Practical cases of art village construction in Asia.

	Paradigm of environment construction	Paradigm of cultural revival	Paradigm of industrial development
Typical cases	Echigo-Tsumari area in Japan, Gamcheon-dong village in Busan, South Korea, Shijiezi village in Tianshui, Gansu, Fuyang Wen village in Hangzhou, Changtangzi village in Maitreya in Yunnan, Bishan village in Yi county	Anhui province; Heshunxu village in Shanxi province; Qingtan township in Xiangtan town, Foshan; Tiancun, Guangdong; Wushan town, Xiangyang, Hubei; Haotang village, Xinyang, Henan	Montmartre village, Paris, France; Greenwich village, New York; Dafen village, Shenzhen, Guangdong; Xiaobao village, Songzhuang, Tongzhou, Beijing
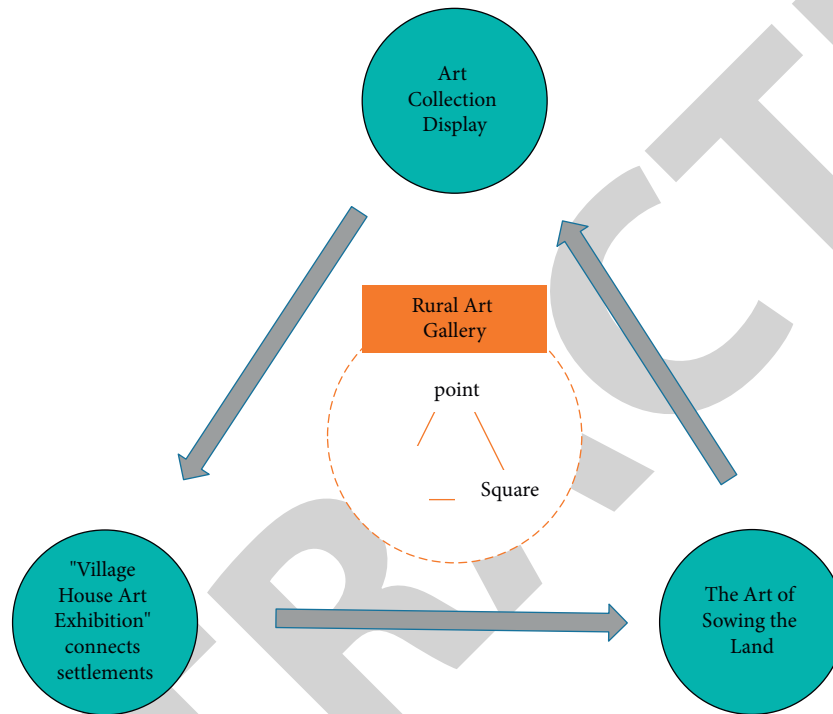
FIGURE 2: Three dimensions of the art township construction of Tugou village.
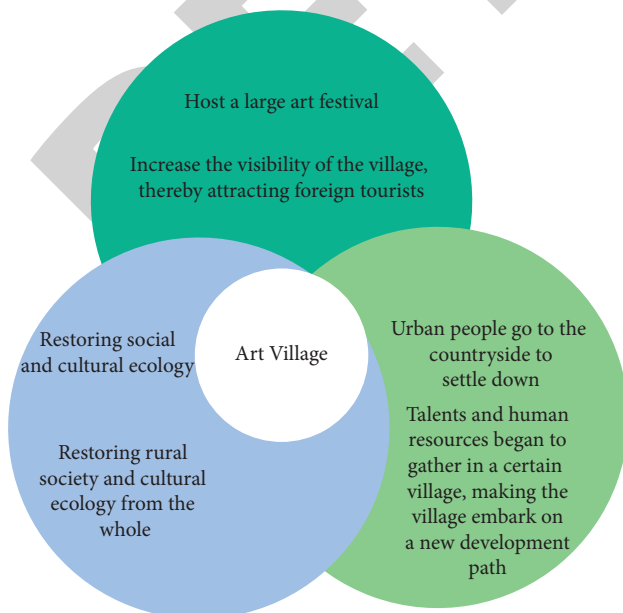
FIGURE 3: Three paths for art township construction.

local traditional handicrafts. Because, in order to restore the local social and cultural ecology, the economic aspect is the most important. After four or five years of this activity, it was declared a failure. Although the "Bishan Project" was unsuccessful, it had a great influence, especially as an idea of "artistic village construction," which was representative. Later, when reflecting on his "art township building" road, Qu Yan basically denied his mode of "art township building" in Xucun but tended to the "Bishan Plan" mode made by Ou Oning and Zuo Jing and then put forward the "Qingtian paradigm." As shown in Figure 4, the so-called "Qingtian paradigm" means to use local traditions from history, economy, belief, etiquette, nature, environment, agriculture, and folk life; then to form new cultural values and social ecology; and then rebuild the rural community society. The "Qingtian paradigm" does not seem to highlight the artistic and aesthetic factors, so why do we still say that it is an "art hometown construction"? Mainly because artists play a leading role in it. The "Qingtian paradigm" still has a great influence among the artists or other intellectuals engaged in the "art township building" all over the country.
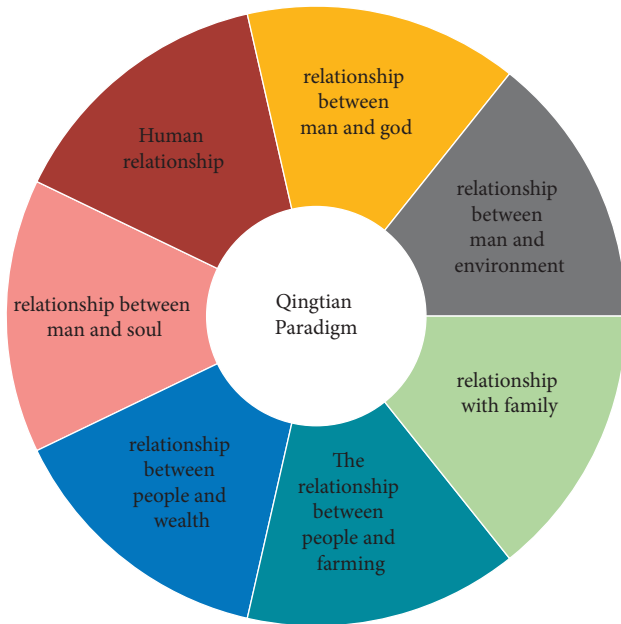
Figure 4: The content of the Qingtian paradigm.

The third path of "artistic rural construction" is to attract urbanites to go to the countryside to settle down and build together. The core issue of rural revitalization and rural development is the issue of talents and manpower. It is not a shortage of people in the countryside, but a shortage of young adults and talents, which is a structural shortage. So how to solve this problem? Undoubtedly, attracting talents and manpower back to the countryside is the key. However, the return of talents may encounter some policy obstacles, cognitive obstacles, and other problems at present. Only some places with special endowments can realize the return of talents and manpower to the countryside.

3.2. The Aesthetic Illusion of "Artistic Village Construction". In the practice of "artistic village construction," the aesthetic concept of artists is often not recognized by the villagers. Sun Jun recalled, "When I first entered the village, I joined the village renovation and improvement work as an artist. I hoped to use art to activate the village. I liked the works I created during this period, and my teachers and colleagues also highly praised them. But the villagers at that time did not like these works at all. For more than 100 years, the government and intellectuals have implanted a modern aesthetic concept in the hearts of the villagers, that is, only new, useful and urban are beautiful, and the local old, traditional means backward.

At present, China's art intervenes in the practice of local creation, and the transformation or reconstruction of some rural buildings, spaces, and environmental landscapes ignores the cultural characteristics of local customs. Migrant workers and local villagers are influenced by the concepts of urban modernization, urban landscape, aesthetic standards, etc. and also tend to rebuild the original village greening, housing construction, public space, etc. according to urbanization standards, so the overall artistic aesthetic and landscape transformation of the countryside have a homogeneous tendency. Rural construction seems to have entered the strange circle of imitation and replication, the successful experience of rural construction in a place seems to have become a standardized template for "beautiful villages," and the tendency of art township construction is to be formatted, patterned, and uniformized, while ignoring localization, personalization, and differentiation; the consequence of this phenomenon is the lack of staying power of local creation.

4. Results and Analysis

4.1. The Paradigm of Environmental Construction in Art Village Construction. Generalized environmental art including architectural art, garden art, and outdoor installation art is the main direction for artists to carry out rural art practice, as shown in Figure 5.

The artist's artistic realization of the rural environment through the creation of works is the most intuitive expression of the environment creation paradigm. Therefore, the "presence of the work" has naturally become the most prominent feature of this paradigm at the phenomenal level. Different from traditional art forms such as painting, music, and literature, environmental art works generally have the closest relationship with the subject of their appreciation. The first contact between the subject and the countryside is the environment, and the artistic transformation of the rural environment prompts the subject to have a strong sense of artistic presence in the process of perception and experience. Compared with the lively scene of the continuous production of art exhibition space, the relationship between local villagers and works of art is worrying. Although art works attract foreign artists and tourists, they are rarely directly related to the lives of villagers. This makes one wonders, do the villages really need art galleries? Its purpose is to break the boundaries between urban and rural areas and gradually realize the social justice of aesthetics. Although the phenomenon of artistic intervention at this stage is often misunderstood as the wishful thinking of the artist, in the long run, its influence on the aesthetic consciousness of the villagers should be positive and subtle. Through the influence on the villagers' aesthetic consciousness, they can find the artistic meaning of the artistic creation environment and integrate the art into their lives, so as to shorten the distance between them and the art.

4.2. The Cultural Revival Paradigm of Art Village Construction. Art intervention in rural construction should be rooted in the local natural environment and cultural characteristics and comprehensively consider the overall environment and local characteristics of the countryside. In recent years, the rural transformation in some places has shown a trend of "local-space tension," and some villages have blindly copied and imitated in the process of planning and construction, not according to the actual situation of the countryside, resulting in the scene of "one side of a thousand villages." In the artistic process of rural environment, some
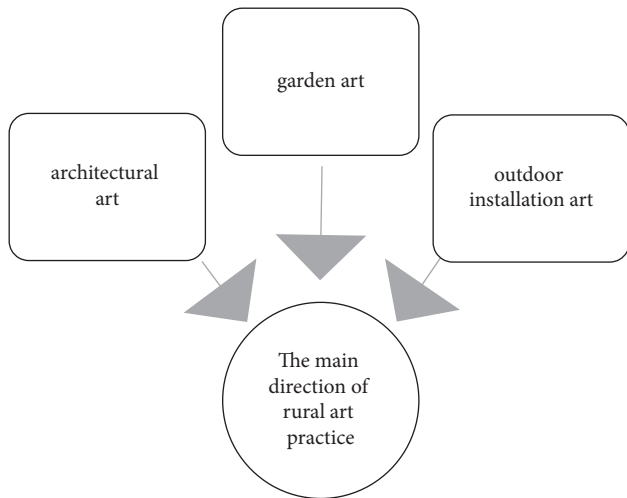
Figure 5: The main directions for artists to carry out rural art practice.

artists have done critical thinking on the above-mentioned environment creation paradigm and believed that art rural construction should not be wasted directly in the figurative process of artistic creation, but from the perspective of art ontology do some reflection. The problems faced by most rural areas in China are the decline of environmental quality and the decline of local culture. However, the phenomenon of farmers "leaving the soil" caused by urbanization has brought unprecedented pressure to the inheritance and development of rural culture. The urgent problem of rural construction is not only the renewal of the material landscape and the cultivation of the industrial economy, but also how to promote the social development of rural communities by revitalizing the local culture that has been gradually disintegrating under the influence of globalization and urbanization. So, artists began to call that "art village construction" and "art village construction" are not the same thing. Artists should proceed from the standpoint of respecting local knowledge, no longer confined to the traditional category of "art creation," and directly take the social practice of rural construction as a creative process. The "cultural revival paradigm" was born from this.

In general, the cultural revival paradigm is devoted to the excavation and inheritance of local culture and respects the authenticity of culture. However, based on this basic law, the paradigm further criticizes and reflects on the current general art village construction, material, and intangible cultural heritage protection and further reflects the transformation of the following two dimensions.

4.2.1. "De-artization" of Intervention Methods.

Under the influence of successful cases, a large number of artists began to go to rural areas, and the creation of works such as land art, architecture, sculpture, and murals with rural themes began to become the origin of art intervention in rural construction. However, due to the lack of long-term accumulation and practical experience of rural life and field investigations that go deep into local society and history, a large number of works cannot be closely related to rural life

and local context but simply depict different artists' personal views of "field idyll-style utopia." These social practices themselves do not have the characteristics of art but stand in the position of authenticity of local culture, showing tendencies such as sociology or anthropology.

4.2.2. "De-heritage" of Work Policy.

Although the revival of culture always revolves around the authenticity of local culture, the artist is not and does not want to be a heritage protection worker. Whether it is a material form of heritage or an intangible form of heritage, the focus of the artist's work is not through ancient buildings. The means of repairing and inheriting skills is not to "reproduce" the heritage but to bring the heritage back to life. The disappearance of local traditional architecture and craftsmanship is the result of the failure of local culture to adapt to the new way of life in the context of globalization and urbanization. This means that the "evolution" of local culture requires sacrificing a part of its authenticity to maintain its cultural vitality, and the artist's job is to try to minimize the loss of this authenticity.

4.3. The Industrial Development Paradigm of Art Village Construction.

The industrial development paradigm is that artists intervene in the industrial construction of the countryside to promote the revitalization of the rural economy. In the process of rural construction, it generally follows the laws of industrial economics from a gathering area formed spontaneously by artists to an art industrial park. In order to improve their professional skills, promote their works and meet more artists, curators, critics, and even future employers. The village of Montmartre in the north of Paris, France, was originally just a remote and low-cost village, attracting a large number of painters, sculptors, writers, musicians, architects, and interns who were struggling to make ends meet. With the gathering of artists, a large number of exhibition halls, galleries, and art dealers have gradually settled in, making the village itself undergo earth-shaking changes and become a well-known art highland today.

Although the main purpose of the gathering of young artists is to seek their own development with no intention of intervening in rural construction, the presence of artists has injected new vitality into the isolated and backward rural communities. More importantly, artists create, communicate, and exhibit in the countryside, attracting art dealers and tourists, and potential markets are quietly born, laying the foundation for the development of the traditional art industry and even today's cultural and creative industry.

Among the many industry-led art villages in China, Shenzhen's Dafen oil painting village has become China's most famous art industrial park relying on the countryside with its output value of hundreds of millions. In 1989, Hong Kong painter and art dealer Huang Jiang came to Shenzhen to copy and sell oil paintings. He settled in Dafen village because of the cheap rent advantage and started to produce line paintings, which were specially supplied to Walmart supermarkets in the United States. With the development of export trade, the demand for line paintings has increased,

production has gradually turned to streamlined production, and the number of painters employed has also increased. Under the influence of the development trend and law of the industrial economy with creativity as the core, most art villages have shifted from single-form commodity art production and sales villages to comprehensive cultural and creative industrial parks in terms of development path and industrial structure.

In the industrial development paradigm, although the intervention of artists may not be entirely for commercial purposes, it is mainly "commodity art" and accompanying industries such as tourism that promote the development of rural economy. Of course, in real cases, regardless of environmental creation or cultural revival, most villages have realized the development of industries, especially tourism industries, after the intervention of artists.

4.4. The Core of Art Village Construction: Environment, Culture, and Industry. At the practical level, the three paradigms of environmental creation, cultural revival, and industrial development appeal to the different starting points chosen by artists when carrying out rural construction activities. Industry, these three cores appeal to three important problems faced by rural areas in our country.

In terms of environment, from the end of the last century to the beginning of this century, the large-scale evacuation of villages and relocations caused constructive damage to the original rural living environment, and traditional buildings and street spaces were destroyed. Under the influence of globalization and urbanization, villagers took the opportunity of improving production and living conditions to redefine their home landscape by using materials such as concrete and color steel tiles, breaking the local order of the original environment.

In terms of culture, the dissemination of information and value changes as internal factors and the changes of population structure, society, and natural environment as external factors have jointly caused the variation of rural culture. The improvement of traffic conditions and the development of new media technologies have made the exchange of information between rural areas and urban areas more frequent. Urban thinking and urban lifestyles have impacted local culture, and cultural events and cultural ceremonies such as festivals, customs, beliefs, and clan relations have faced challenges, difficult choice of alienation or decline.

In terms of industry, although the country's economic aggregate is expanding, the added value of the primary industry has gradually declined in the past 15 years. The "local Chinese society" is no longer economically dependent on the primary industry. The situation is as follows: Industrial development in rural areas has created enormous pressure. The second and tertiary industries continue to erode the traditional agriculture, forestry, animal husbandry, and fishing, and the resolute adjustment of the rural industrial structure has made the countryside lose its foundation and transformed it into some other kinds, in the sense of production areas, parks, scenic spots, and even business districts.

Based on the above three aspects, the three paradigms of art intervention give different responses. The intention of the environmental construction paradigm is to promote the renewal of rural landscapes through broad environmental art design, and the renewal process is not only to promote the metabolism of rural landscapes, but also to introduce artistic and creative construction thinking, in order to improve the rural ecological environment and the quality of human settlements. At the same time, the environment is regarded as a work to be displayed to attract visitors. The cultural renaissance paradigm aims to uphold the principle of authenticity to revitalize local culture. Its intervention method is influenced by anthropology and sociology. It advocates uniting local residents, removing the main role of artists, and regards the process of mutual assistance as the formal composition of works, which is a contemporary. In this context, efforts have been made to maintain the rural society. The industrial development paradigm follows the development path from the artist gathering area to the art industrial park, develops the art industry through the production of commodity art, gradually replaces the primary industry in the industrial structure, creates capital under the guidance of the law of market operation, and provides rural areas, guarantee of economic development. The comparison of the three intervention paradigms is shown in Table 3.

It needs to be emphasized that the three intervention paradigms only represent the different starting points or emphases selected by the artists in the rural construction action based on their own knowledge background and combined with the actual situation of the case. This does not mean that the three paradigms are limited to solving their corresponding rural problems. In fact, with the continuous deepening of the artist's rural construction practice, environmental, cultural, and industrial problems have also been exposed. When implementing the rural construction plan, the artist also hopes to jointly realize the comprehensive revitalization of the case village from three aspects. From Echigo-Tsumari in Japan to Changtangzi village in Yunnan, China, the creation of rural environmental art has never been purely environmental transformation. The creation of works and the planning of exhibitions have taken into account the development of the accompanying tourism industry. From the left Jing and Ou Ning's Bishan Plan to Qu Yan's Xucun Declaration, the rural cultural revival plan formulated by the artist also always includes the restoration and reuse of vernacular architecture, residential courtyards, public spaces, and other living environments. From Fen to Songzhuang in the north, the creation of the art industry highland is more connected with the reconstruction and promotion of local culture.

Recently, the art village construction team represented by the curator Zuo Jing put forward the theory of "three productions" after summarizing the previous practical experience in Anhui, Guizhou, and Yunnan: the production of space, the production of culture, and the production of products. The core of the three art villages of environment, culture, and industry has been unified and sorted out. At the

Table 3: Comparison of three art village construction paradigms.

	Paradigm of environment construction	Paradigm of cultural revival	Paradigm of industrial development
Art form	Environmental art	Collaborative art	Commodity art
Process characteristics	Independent creation	Joint local residents	Cluster production
Effectiveness of intervention	Subjectivization/production	Desubjectivization	Productization
Intervention goal	Reconstruction of environmental semantics	Inheritance and interpretation of local culture	Replacement of art industry
Spatial attributes	Transformation of connotation-production of display space	Continuation of connotation	Transformation of connotation-production of consumption space
Existing problems	Local context breakage	Only social and ethical standards	Consumerist aesthetics and low participation of residents

end of 2016, Zuo Jing's team came to Wengji village in Jingmai mountain, Yunnan province, to solve rural environmental, cultural, and industrial problems in parallel and started the "Jingmai Mountain Project" after a detailed inspection of the local natural ecology and human ecology. In terms of environmental renovation, the artists carried out repairs to some of the traditional dry-column buildings in the Wengji Bulang ancient village and gave the building space new vitality with exhibition halls and homestays; in terms of cultural revival, the artists collected and sorted out the historical context of the village and reproduced it as a "local teaching material" through text, hand-painting, and multimedia, providing a way for residents, especially children, to reunderstand the village culture; the work in industrial construction combines cultural revival and environmental transformation. Tea culture: the interpretation of the hotel and the creation of homestays help the integrated development of the local tea economy and tourism industry. It can be seen that against the background of the anthropological turn of the artist's thoughts on rural construction and the commercialization of rural construction activities, several types of construction paradigms formed in the early stage are gradually disappearing into each other.

Nowadays, the ideological trend of "social restoration" in rural areas promotes "artistic rural construction" to break through the stubbornness of the paradigm step by step. The reconstruction of environmental semantics, the transformation of culture and art, and the transformation of industrial structure have become the common focus of artists' intervention. "Art village construction" is developing in the direction of originating from the field of art but beyond the field of art. Under the guidance of the top-level design of Beautiful China and Beautiful Countryside, the aesthetic value of socialism with Chinese characteristics in the new era has returned to the standard of rural construction, providing more opportunities for the active display of the artist's aesthetic knowledge structure and social practice ability. At the same time, national policies and theoretical and practical development trends have promoted the path innovation of art rural construction, making it gradually enter a new historical stage, bringing a richer and more prosperous future to China's rural construction.

5. Conclusion

As we all know, "rural revitalization" is a national strategy. How to achieve rural revitalization requires a lot of exploration. The integration of art into rural construction and art and rural modernization construction is a new strategy for transforming rural landscapes, beautifying rural cultural spaces, defending rural characteristic culture, and promoting rural revitalization in the context of local creation, and "art village construction" can not only bring tangible benefits to rural areas in terms of material production, rural tourism, investment attraction, etc., but also promote the restoration of rural internal culture, so that the village embarks on a virtuous circle of self-development. In this regard, "art village construction" provides a very effective landing path for rural revitalization. Art intervention in rural construction should take local villagers as the main body of rural construction, hook local historical and cultural resources, do a good job of local culture filing, take the construction of public art in visual form and integrate it into local life art projects as the theme to form regional characteristic work content, take the revitalization of local culture as the goal, combine the cultural tourism industry, promote rural aesthetic education actions, restore the innovative vitality of rural areas, and promote the growth of local traditional culture, so as to create a sustainable cultural format for rural revitalization.

Data Availability

The dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

Hindawi

Retraction

Retracted: The Relationship between Traditional Music in Xinjiang and the Geographical Environment of the Gobi Desert

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] S. Ma, "The Relationship between Traditional Music in Xinjiang and the Geographical Environment of the Gobi Desert," *Journal of Environmental and Public Health*, vol. 2022, Article ID 5610363, 9 pages, 2022.

Research Article

The Relationship between Traditional Music in Xinjiang and the Geographical Environment of the Gobi Desert

Shuhao Ma ⓘ

South-Central Minzu University, Wuhan 430074, Hubei, China

Correspondence should be addressed to Shuhao Ma; 2012088@mail.scuec.edu.cn

The natural environment and geographical environment provide the possibility for human survival and development and are also the premise of the formation of music culture. When studying the style characteristics and cultural types of music, more comprehensive and correct conclusions can be drawn only when considering various regional factors such as geography and topographic environment. If we want to explore the music of Xinjiang, we must understand the regional culture. The special geographical location of the Silk Road gives Xinjiang a foreign style compatible with Chinese and Western cultures. At the same time, because of the geographical environment of the Gobi Desert, the music style of Xinjiang is unique. This paper explores the relationship between the traditional music of Xinjiang and the Gobi desert, through the investigation and study of Xinjiang and various musical styles, which have certain reference significance for the study of the Chinese traditional culture.

1. Introduction

The formation and development of any national culture must rely on a specific spatial range, but each spatial range is not consistent. As a result of the influence, the resulting national cultural forms are also quite different. As an indispensable part of national culture, music culture runs through ancient and modern times and brings important significance to people's daily lives. When studying the style characteristics and cultural types of music, only by comprehensively considering various regional factors such as geography, landform environment and so on [1] can a more comprehensive and correct conclusion be drawn. China's land area is vast, covering almost all types of landforms such as hills, plains, plateaus, and mountains [2]. Different ethnic groups live in different geographical environments. Each ethnic group speaks different languages and receives different cultural education. This has formed a variety of life and labor patterns, shaped a unique national character and temperament, and created a large number of characteristic musical works [3]. Therefore, if we want to explore Xinjiang's music, we must understand the regional culture [4]. Xinjiang's geographical location is in the center of Eurasia,

and many "Silk Roads" pass through the middle, becoming the core of the fusion of Chinese and Western cultures and economies. As the process of cultural and economic exchanges between different regions develops in depth and breadth, the importance of Xinjiang as an open-world platform is even more prominent. The excellent civilizations of ancient India, Babylon, and ancient Egypt collided here, which promoted the final formation of Xinjiang's characteristic regional culture [5]. Xinjiang is located in an extremely arid desert area in the middle temperate zone, with high temperatures and little rainfall throughout the year, surrounded by high mountains, far from the ocean, and closed to the natural geographical environment. However, the more blocked the traffic and the fewer foreign exchanges, the more distinct the regional characteristics will be, and the more complete the local music varieties and styles will be stored [6]. The details are shown in Figure 1. It has historically been at the heart of the political, economic, and cultural intersection of East and West. The four major systems of ancient Chinese culture, Indian culture, Persian culture, Greek culture, and Islamic culture converged here through the Silk Road and influenced each other. Absorb nutrients from it, and on this basis, carry forward the unique
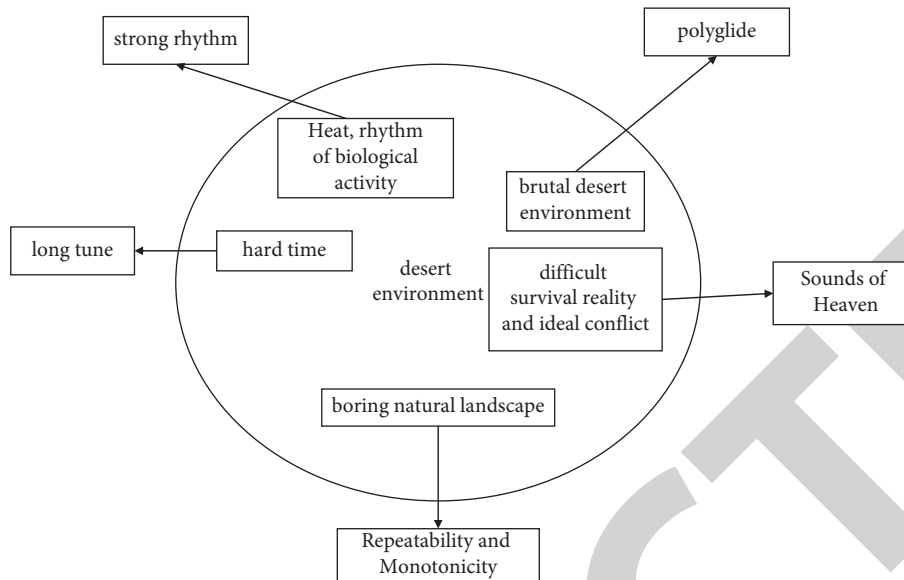
Figure 1: The relationship between traditional music in Xinjiang and the geographical environment of the Gobi Desert.

regional culture of the nation and pass it on with the development of history. It is also the province with the largest number of neighbours and the longest borders. The national border stretches for several kilometers and accounts for about the total length of our land border. Xinjiang music is best known for Uyghur folk music. It inherits the ancient artistic traditions of Guizile, Gaochangle, Yizhoule, Shule, and Khotanese and retains a strong national character. Due to the geographical separation, in the long-term historical development, Uyghur folk music in various parts of Xinjiang has been infused with the milk of local life, forming several musical color zones with very different styles, namely the southern Xinjiang color area, the eastern Xinjiang color area, and the Daolang color area.

The above-mentioned content of Xinjiang's regional culture restricts the choice of Xinjiang's music themes and styles; the development of Xinjiang's music also promotes the spread of regional culture; and the two influence each other and form a symbiotic relationship. The people of Xinjiang can sing and dance well, so they have the reputation of being "the hometown of singing and dancing" [7].

The various notes and rhythms of music can make us express our feelings of joy or sorrow. The specific geographical environment and the natural environment provide the possibility for the survival and development of human beings and are the prerequisite for the formation of music cultural geography. I have already talked about the way in which the regionality and time and space of the geographical environment act on the music culture and the influence of the geographical environment on the genre and style of music. Xinjiang is a multiethnic area. Xinjiang's folk music has obvious "regional characteristics" in melody and rhythm. The folk music in Xinjiang is mainly dance music, and different regions produce different folk dance music themes. Xinjiang's folk dance can be said to be the treasure house of Xinjiang's music culture, providing many types of music creation materials. Since the piano piece "Three Pieces

of Kazakh Dances" created by the people's musician Xian Xinghai based on Kazakh music materials in the 1990s, Chinese composers have used composition theory and composition techniques, combined with the music materials of many ethnic groups in Xinjiang to create a large number of piano works.

2. The Influence of Xinjiang's Geographical Environment on Music Culture

The geographical environment of Xinjiang has had a profound impact on the living habits of the local people, and culture with local ethnic characteristics has emerged, resulting in distinctive ethnic traditional music, as shown in Figure 2.

2.1. Geography and Landforms of Xinjiang.
The overall pattern of Xinjiang can be summarized as "three mountains and two basins": the northern part of the territory is the Altai Mountains, the southern part is the Kunlun Mountains, and the Tianshan Mountains traverse the middle, and together with the northern Junggar Basin and the southern Tarim Basin, they form the geomorphological pattern of Xinjiang [8]. Xinjiang has a vast territory, surrounded by mountains, far from the sea, and deep inland. Due to the blocking of the mountains, the moist airflow of the ocean cannot reach, so the climate is dry and hot, belonging to the arid and semiarid zone, forming a large desert, and the natural oasis distribution area is small. Xinjiang has the longest inland river in China: the Tarim River. The Tarim River is a kilometer long and is an important river channel in Xinjiang. It is formed by melting icebergs and snow. Xinjiang has the largest desert in China: the Taklimakan Desert. It is a mobile desert formed by the movement of dunes under the action of wind. The area is second only to the Sahara Desert in Africa, ranking second in the world. Xinjiang also has the largest basin in
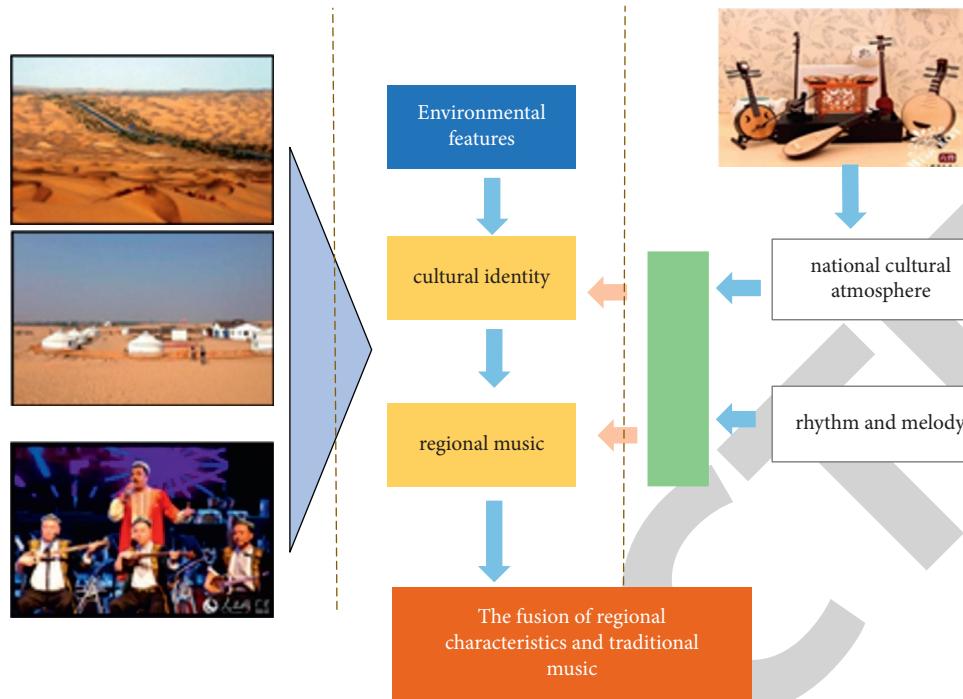
FIGURE 2: The influence of Xinjiang's geographical environment on music.

China: the Tarim Basin, which is located between the Tianshan, Altun Mountains, and Kunqi Mountains. Xinjiang is arid and less rainy, with very little precipitation every year, and precipitation is unevenly distributed throughout the region. Xinjiang has a long sunshine time, and the sunshine time is long throughout the year. Because of the sufficient photosynthesis, Xinjiang's melons and fruits are particularly juicy and sweet. However, there is a huge temperature contrast between day and night in most areas of Xinjiang [9]. There are also obvious temperature differences between spring and summer in Xinjiang. In the coldest month, the average temperature in the Junggar Basin is as low as minus degrees. Among them, Fuyun County once became one of the coldest areas in China with a rare low temperature of minus degrees. The hottest place, Turpan, is named "Huozhou" and has become the hottest area in China with high temperatures. The natural environment in Xinjiang is relatively harsh, with a hot and dry climate, large daily temperature difference, and frequent dust and storms. But it is under these living conditions that the willpower of the Xinjiang people to fight stubbornly has been formed. In a tough environment, music has become a great way to treat their pain and depression. Singing, dancing, and poetry from life have naturally become their spiritual sustenance. They are good at dancing. They dance in a simple and unrestrained style and have a typical nomadic temperament. The lofty melody in their singing also reflects their optimistic and open-minded spiritual quality [10].

2.2. Unique "Oasis Culture". "Oasis" refers to a unique production method that exists in Xinjiang. River basins and the surrounding areas of basins are where oases are concentrated, and water sources have become the first consideration for people to migrate and settle. For example, the Hami Oasis, the Hotan Oasis, and the Yanshi Oasis are all based on farming. In the earliest days, oases in Xinjiang were only scattered in large and small river areas, forming a pattern of scattered villages [11]. After passing through Gansu Province, crossed the southeastern part of Xinjiang, and extended eastward to the west coast of Central Asia and North Africa, forming a line that traverses east and west. Due to the severe physical and geographical environmental restrictions, Xinjiang is arid and rainy all year round, surrounded by deserts and sandstorms, and surrounded by large tracts of Gobi and mountains [12]. The spatial index of Xinjiang is shown in Figure 3.

Under this circumstance, the development of agriculture, animal husbandry, and handicraft industry in the oasis area has been affected to a certain extent, but it has brought new opportunities for business development. First, the caravan economy of the Oasis Silk Road has promoted the transformation of the caravanserai into an oasis city-state with the nature of an economic and cultural center, and the economic prosperity has promoted the development of the music culture of the city-states on the Oasis Silk Road. Second, the princes, nobles, and merchants of the oasis city-state, in order to meet the needs of economic and social exchanges, summoned some outstanding folk artists into the princes' or private residences, making them professional artists and then becoming representatives of promoting the development of local music. At the same time, local folk music has also been systematically sorted out, standardized, and improved. Third, the Oasis Silk Road not only promotes the communication of music culture between oasis city-states but also becomes a channel for music exchanges in
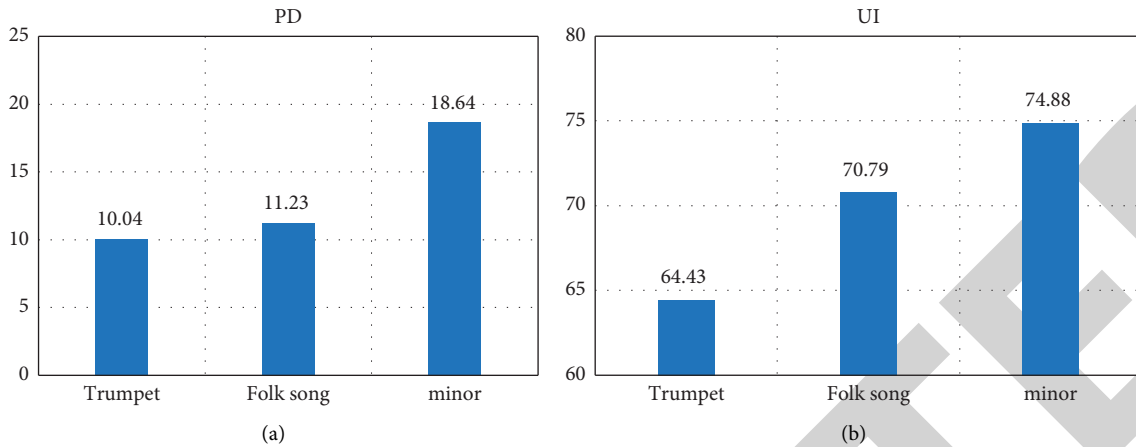
FIGURE 3: Spatial pattern index of Xinjiang folk music.

foreign countries. Fourth, the high development of commerce and handicrafts on the Oasis Silk Road has provided sufficient strength for the advent and development of a variety of musical instruments. Fifth, because religious etiquette is an important carrier of musical activities, the spread of various religions through the Oasis Silk Road in history has had a profound impact on oasis music culture. With the considerable profits brought by commercial trade, not only the villages in the oasis are more prosperous, but also the exchange process between the east and the west is accelerated, which provides the soil for the development of the oasis music culture. Xinjiang's "oasis culture" represents a characteristic of compatibility between Eastern and Western cultures [13]. The special geographical location that there is less communication with the outside world and a large number of local characteristics of Xinjiang are relatively preserved, which provides an opportunity for the formation of national culture. It has become a window for the introduction of cultures from ancient Rome, ancient Greece, ancient India, and other countries. Under the continuous impact of Chinese and Western cultures, Xinjiang Oasis Culture has also continuously absorbed foreign elements to expand the compatibility of its own culture. The ontological characteristics of Xinjiang oasis culture are traditional farming culture, grassland nomadic culture, and various religious cultures [14]. Together with foreign and heterogeneous cultures, a cultural circle of coprosperity has finally been formed, in which various cultures bloom, penetrate, and influence each other. On the premise of keeping its characteristics unchanged, the oasis farming culture has widely embraced other foreign cultures with different attitudes and has integrated various elements into one, which has laid the strong national foundation of Xinjiang oasis culture. In the long-term evolution of history, the oasis culture has also gone through the stage of development-absorption-redevelopment. The Xinjiang nation has developed to the current stage and has actually become the result of the integration of multiple cultures [15]. Whether it is the ancient Silk Road civilization or the current modern civilization, the Xinjiang oasis farming culture has formed unique cultural characteristics after changes and has a long

history. Oasis culture is unique, not only in the ecological environment but also in the national character. The culture of a nation is limited by regions, and its economic culture, geographical environment, and historical development trajectory will be different, and people living in this region will also be affected by different cultural existence states in behavior, psychology, and personality [16]. Xinjiang oasis culture embodies integration, diversity, and integration. Therefore, it is not only the product of the role of the purely regional environment but also the result of the coexistence of oasis characteristics and heterogeneous cultures. Most of the cultural forms of oasis music represent the real life of local people and also include various cultural elements such as local legends, literati poems, and philosophical words [17]. We investigated and analyzed the learning situation of long and short tones, and the specific results are shown in Figure 4. The results found that the majority of the traditional Mongolian songs were vague.

3. The Basic Introduction of Xinjiang Folk Music

3.1. The Historical Origin of the Formation of New Style Music. Xinjiang is located in the central region of Central Asia, which is of great significance in connecting the East and the West and promoting regional economic and cultural development. The longest section of the Silk Road is located in Xinjiang, China (Table 1). This section of the commercial road is more than 2,000 kilometers long and is a very important transportation hub on the "Silk Road." The essence of ancient Chinese culture, Indian culture, Greek culture, and Islamic culture is integrated here, and based on this, a characteristic regional culture with Xinjiang style has been formed [18]. The melody of Xinjiang folk music is beautiful; the rhythm is lively and distinct; the structure is regular and symmetrical; the mood is warm and cheerful; most of them adopt the seven-tone natural mode; and there are also five-tone modes: b7, #1, #2, #4, and #5; and the main accompaniment instruments are tambourine, dongbula, rewafu, iron drum, and so on. The lyrics are easy to understand, and Uyghur's famous large-scale national music and dance epic

Statistics of learning results of short key
(silver ring) and long key (Pastoral)

- Basically master songs
- Haven't mastered the song yet
- Able to distinguish Mongolian long and short tones
- The long and short tones of the Mongolian are ambiguous
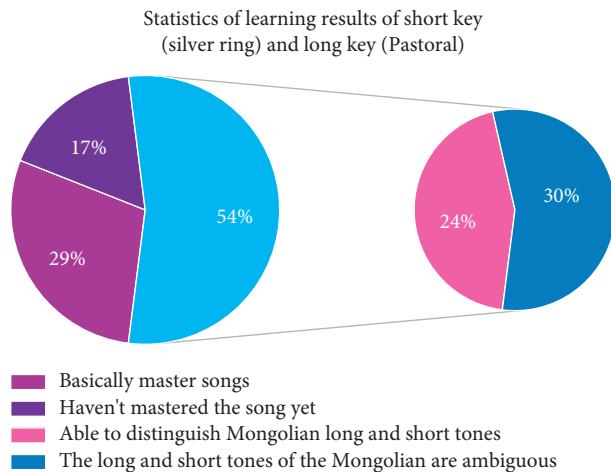
Figure 4: Statistical chart of student learning results.

"Twelve Mu Kam" has long been circulated among the people and is deeply loved by the masses. Going back to the origin of music, Xinjiang is mainly influenced by three major systems: Mongolian system, Iranian music system, and European music system. The main characteristics of these three music systems can be summarized as shown in Table 1.

Generally speaking, the typical music style of a region is usually represented by the folk songs of the region because folk songs are the crystallization of the unique society and human culture of the region after years of development and evolution and then processed by people [19]. Xinjiang has always been a multiethnic area in history, and among the thirteen ethnic groups living in it, Uyghur, Han, Kazakh, Kirgiz, and Tajik are the most representative. Because these five ethnic groups have already lived in Xinjiang before Turkicization, it is necessary to study the musical styles of these five ethnic groups in order to understand the historical origins of Xinjiang's musical styles. Du Yaxiong showed in his research results that the formation of a national musical style is closely related to the ethnic characteristics of the ancient ancestors of the nation, rather than the religious beliefs, the inhabited areas of the nation, or the national language. The ancestors of the Han nationality migrated from the Central Plains, and the race belongs to the branch of Mongolia, so the music of Han nationality reflects the style characteristics of the Mongolian system [20]. The ancestors of the Xinjiang people are mainly the Uighur people, which were renamed from the Ouigour people, and also included the residents from Iran and primitive Europe. These three parts are the main sources of the original residents of Xinjiang, as shown in Figure 4. Mongolian music is characterized by a distinct national style: beautiful melody, wide atmosphere, deep feelings, and strong grassland atmosphere. Mongolian music is dominated by folk songs and raps associated with nomadic life. There are traditional ancient hymns, hymns, feasts, and many songs that reflect the lives of herders. Mongolian folk songs are divided into two types according to their musical characteristics: "Urtu" songs (i.e., long-key songs) and "Uhur" songs (i.e., short-key songs). The former has a free rhythm and a long breath, with

a slow speed and a wide range of sounds; the latter has a distinctly regular rhythm and a brisk speed.

Each of these three systems has its own characteristics: Huiya belongs to the Mongolian race. The main features of this type of race are long faces and high cheeks. They migrated from east to west to the Hami area of eastern Xinjiang more than 3,000 years ago; the Iranian race originated from the ancient eastern Mediterranean region; and Pamir-Fergan is a branch of primitive Europeans, and the typical feature of this race is the short face, which first appeared in the Ili River Basin in Xinjiang. The Pamir-Fergan type is closely related to primitive Europeans, so researchers regard this species as the result of the evolution of primitive Europeans. Since the formation process of the Uyghur nation is influenced by the three types of ethnic groups, the music style also has the characteristics of the Mongolian system, the Iranian system, and the European system. Taking the Kazakhs as an example, going back to the historical origin, the formation of this nation comes from two major systems: one is the Pamir-Fergan, which belongs to the primitive Europeans; the other includes the Huiya and Khitan tribes, which belong to Mongolia. Therefore, Kazakh folk music has the common stylistic characteristics of the two systems. The ancestors of the Kirgiz people came from the Lianghe region of Europe and belonged to primitive Europeans. They lived in the southern part of Xinjiang and were the product of the great migration and integration of residents. Therefore, the national music style of the Kirgiz people has the characteristics of the Persian-Arab system and the two European systems. The ancestors of the Tajiks originate from the Xian, which is related to the Mongolian race. Therefore, the music of the Tajiks has the characteristics of the Mongolian system. From the analysis of the musical characteristics of the abovementioned ethnic groups, we can comprehensively analyze the formation of the musical styles of each ethnic group from the perspective of one or several musical systems to which they belong.

3.2. Piano Music Works in Xinjiang Regional Culture. The creation of Chinese piano music is based on the materials of Chinese folk music, and it is significantly different from Western piano music in terms of tonality, harmony, and creative techniques. The earliest Chinese piano music works were adapted from Chinese folk songs, and the music theme adopts the melody widely circulated in folk songs, with obvious Chinese pentatonic color in debugging. China has a vast territory, so Chinese piano music reflects the cultural characteristics of many regions. Every nation and every region has its own unique regional culture. National music takes regional culture as the cradle and breeds musical styles that are different from other regions. As the carrier of music, the piano improves the creation of folk music and enriches Chinese piano works. It uses piano skills to push folk music to a newer and more mature stage so that the music works have distinct regional characteristics. The differences in regional culture have led to different styles of Chinese piano music works, and many places have their own representative piano works. The details are shown in Table 2.

TABLE 1: Main characteristics of the three music systems.

	Mongolian system	Iranian system	European system
Tone structure	Tone with cavity	Tone conditionally with cavity	Tone without cavity
Music organization	1. The mode is based on three tones and four groups	1. The mode is based on the four-tone series	1. The mode is based on the four-tone series
	2. Pentatonicity of tones	2. Melody has no functional and surface meaning	2. Melody has functional and surface meaning
Beat rhythm	1. Loose plate	1. There is a board (characterized by a fixed rhythm pattern)	Rhythm with a board
	2. Nonrhythmic board	2. Loose plate	
	3. The rhythm has a board	3. Mix the beats	
Texture characteristics	Mainly lateral thinking	Lateral thinking, but when there is a fixed rhythm pattern IV, it shows the characteristics of vertical thinking	Mainly vertical thinking

TABLE 2: Regional characteristics of each region and representative works of piano music.

Area	Representative work
The Loess plateau is located in the northern Shaanxi region of China. The natural environment there is harsh, stormy weather, road asaki woman, but living in the area of people cheerful and optimistic, not afraid of real harsh conditions, create a style of coarse mining atmosphere piano works	Its representative works are Wang Jianzhong's "Shan Dan Dan Blossom Red" and Zhou Guangren's "theme variations of North Shaanxi folk songs." The theme of "Shan Dan Dan Blossom Red" is based on the traditional folk song "when the red army brother comes back" in northern Shaanxi. It depicts the welcome scene of the people in northern Shaanxi when the red army returns from winning the battle. The music is cheerful and clear and beaming.
The nomads of the Inner Mongolian grasslands love the blue sky and white clouds, the galloping eagles, the endless grasslands and the unrestrained freedom of life. Inner Mongolia people treat the distant guests sincerely, with warm and straightforward character, so the Mongolian music style is simple and moving, with melodious melody, straight through the people's hearts.	His representative work is "seven theme songs of inner Mongolia folk songs" by Sang Tong. The seven songs include "memorial," "friendship," "homesickness," "prairie love song," "the children's dance," "grief," and "dance"; the piano works are in inner Mongolia local folk songs, for its melody, rhythm, and the content of the music to reflect the daily life of inner Mongolia people.
Guangdong area is located in the south of China, with a superior geographical environment and a comfortable and pleasant climate. Therefore, the Guangdong music tune is light, compact rhythm, delicate and small structure, with elegant and chic-style characteristics.	Guangdong area is located in the south of China, with a superior geographical environment and a comfortable and pleasant climate. Therefore, the Guangdong music tune is light, compact rhythm, delicate and small structure, with elegant and chic-style characteristics.
Yunnan-Guizhou Plateau area is mostly mountainous; influenced by its specific geographical environment, the music works of Yunnan-Guizhou area usually have a strong folk song characteristics; and the melody line is broad and long, easy to be sung between the mountains of qi women. Most of the music in this area adopts the way of flat and straightforward narration, with less decoration and relatively simple structure.	His representative work is zhu Jian's running water, which is a reflection of the simple life of people living in the area. Sichuan is located around the Qinghai-Tibet plateau, with numerous ethnic minorities.
Music in Sichuan area is obviously affected by its geographical environment, and the high mountains are the natural barrier to nature. People living in this region love nature and advocate a simple way of life, so they form a relatively free and casual music style, and have no fixed rhythm mode.	People living in Sichuan love nature and advocate a simple life style, so the music they like is a free and casual style without a fixed rhythm pattern.

4. The Regional Environment of Xinjiang Determines the Characteristics and Content of the Piano Music in Xinjiang

4.1. The Characteristics of Xinjiang's Piano Music. Xinjiang plays an important role in connecting the Eurasian continent and has a major strategic position. At the same time, it is also the intersection of ancient Chinese culture in the east, Indian culture in the south, Greek culture in the west, and Islamic culture in the southwest. This sparked a fierce spark and brought sufficient nutrition to the economic and cultural development of Xinjiang. Xinjiang's special geographical location determines its historical status. The terrain of Eurasia is mostly high mountains and dense forests. There are three Silk Roads running through it, all of which pass through Xinjiang. The north road goes around the northern part of the Tianshan Mountains in Xinjiang; the south road passes through the south of the foothills of the Tianshan Mountains in Xinjiang; and the inner and outer routes pass through Kuncang Mountain. These three Silk Roads have brought huge development opportunities to the development of the Xinjiang region, making the Xinjiang

region a hub for cultural, artistic, and economic exchanges between countries. Xinjiang Uyghurs have lived on this Silk Road for generations. This superior geographical environment makes it easier for Uyghurs to absorb the essence of Persian, ancient Rome, ancient Greece, and other exotic civilizations for their own use, which is conducive to the widespread use of Uyghur music culture. The Uyghurs, known as the Uighurs, lived in the Mobei region. There are two ancestors of Huihe cranes: one is Dingling, which is an ancient nomadic people living in the area of Lake Baikal, once under the jurisdiction of the Huns. Later, the Huns were defeated by the Turks, and Ding Ling began to embark on the road of independent development. During the Wei, Jin, and Southern and Northern Dynasties, Xinjiang experienced a stage of national integration. The Tubo, Yuezhi, Xian, Rouran, Wusun, Xiongnu, Tubo, Huihe, and so on moved into Xinjiang one after another and lived together with the original residents of the Tarim Basin, forming a multiethnic living pattern. After the Uighurs migrated westward, they were influenced by the Han culture in the Central Plains and the four ancient civilization systems and finally formed the Uyghur nation and Uyghur culture. "Uyghur" means "unity" in the Uighur language. The diverse regional culture makes Xinjiang music inclusive and integrates the elements of folk music from many ethnic groups in Xinjiang, including the three-beat juniper melody and the jumping drum beats. Rhythm. Xinjiang's oasis culture is a regional culture with national characteristics, which endows the people of Xinjiang with a national character of perseverance, which is expressed in the style of music with enthusiasm and liveliness, which is not possessed by ethnic groups in other regions. Xinjiang style piano works have unique artistic charm in melody by using the rhythm combination of round dot, cut, first sixteen, last eight and weak rise. Moreover, they use parabolic melody such as wave, small second and increased second, and other special intervals, "true" and other techniques. The creation of piano works in Xinjiang style shows xinjiang's unique famous scenery and magnificent, vicissitudes of life, and colorful regional scenery. Xinjiang music reflects the influence of regional culture on it, which is reflected in four aspects: beat, rhythm, melody, and harmony as shown in Table 3.

4.2. The Content of Xinjiang Piano Music. The characteristics of rhythm, beat, melody, and harmony in the above-mentioned piano works are unique to the Xinjiang region and cannot be seen in the musical works of other regions. Although Xinjiang-style piano works are numerous and vast, because their creations all originated in the same region, they are constrained by similar geographical environments and cultural background and have similarities in the characteristics of the music itself. Therefore, we can understand the specific regional cultural content of Xinjiang ethnic group from several piano works with typical Xinjiang style. Sun Yiqiang's piano work "Spring Dance" and Ding Shande's "Second Xinjiang Dance" mentioned above were written based on the cultural background of the Xinjiang ethnic group. For each musical form, we investigated the popularity of their works among students, as shown in Figure 5. According to the results, most students still prefer pop music, and only 10% of the students like folk music.

First, it reflects the Uyghur people's enthusiastic and eloquent national character, as well as the national custom of being good at dancing. The Uyghurs are one of the main ethnic minorities in Xinjiang. They are best at performing dance types with strong rhythm, prominent drums, multiple rotations, and unrestrained movements. The inspiration for Sun Yiqiang's creation of the piano piece "Spring Dance" came from the hand drums of the Uyghur people in Xinjiang. It was a common dance in sacrificial activities at first. Women were the main body of the dance, and men were accompanied by hand drums. The artist's adaptation and development have become the hand drum we see today. The author draws on the syncopated rhythm of hand drums and the typical musical rhythm in the creation process. The piano piece "Spring Dance" is very brisk in rhythm, with prominent rhythm and accent, which reflects the overall style of Xinjiang dance's free and easy movements and rapid rotation. In addition, the language characteristic of the Uighur language is that the accent is placed on the last syllable of the multisyllable, resulting in iambic, which is also a reason why the syncopated rhythm is widely used in Xinjiang-style piano works.

Second, it reflects the positive and optimistic national temperament of the Xinjiang people. In the introductory part of "Spring Dance," the author enters in a major key, laying the foundation for the bright colors of the whole song, and the slightly random rhythm has room for free handling, leaving room for people to continue to develop reverie. The use of this kind of loose board also draws on the creation method of Xinjiang's cultural treasure "Twelve Muqam." "Twelve Muqam" is relatively free in the first paragraph, and there is no fixed requirement for rhythm, so it is relatively free. The loose board in the first half is mainly to pave the way for the development of the later music, resulting in the characteristics of first depression and then rising. The theme melody of "Spring Dance" appears many times. The left-hand part uses a continuous syncopated rhythm to maintain a stable rhythm. The right-hand melody changes and repeats. Continue to move forward.

In addition, most of the piano songs "Spring Dance" adopt upward melodies so that the music continues to develop so that the whole piece presents a warm and positive musical atmosphere. In terms of overall musical style, it maintains the strong ethnic and regional characteristics of the Uyghur people in Xinjiang. The rhythm not only reflects the synchronous rhythm of the tambourine but also highlights the main connotation of the warm and unrestrained drum in the melody of Xinjiang, as well as the excellent tradition of the oasis people's positive national character and not being afraid of difficulties. It has endowed the Xinjiang nation with a tenacious national temperament and an optimistic attitude towards life.

Third, Xinjiang piano music is also reflected in the similarity and compatibility of traditional ethnic instruments in Xinjiang, such as the plucked instruments Dongbula and Rewafu. The expressiveness of the instrument

TABLE 3: The beats, rhythm, melodies, and harmonies of Xinjiang music.

Meter	Mix beats, change beats, and loose plate beats
Rhythm	Weak rhythm, attached point rhythm, syncopated rhythm, triple link rhythm
Melody	Parabola type, top true type, song head type
Harmony	High stack processing of the chord, pentatonic chords, sound structure, compound chord, parallel harmonic progress, stubborn progress
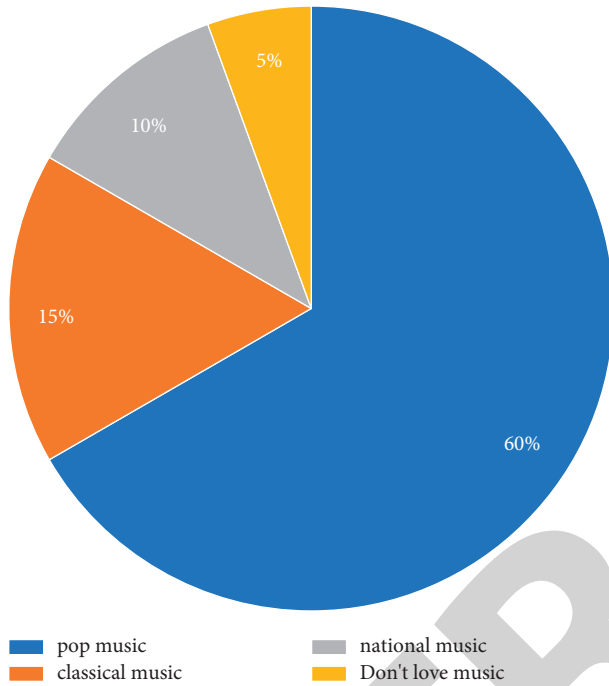
FIGURE 5: Students' love for all kinds of music.

is often used to set off the warm and cheerful rhythm and melody. Dongbula is a common piece of music in Xinjiang. It can be played with a wide range of sounds, bright timbre, and vivid and diverse performance forms. Rewaf is a wooden musical instrument, often used to play brisk and lively tunes. The bass accompaniment part of "Spring Dance" usually highlights the rhythm and accent and is clean and neat, just like playing the traditional musical instruments of the Xinjiang people, which is refreshing.

Fourth, it reflects the cultural characteristics of Xinjiang's inclusiveness. Xinjiang is located in the central region of Central Asia, which is of great significance in connecting the East and the West and promoting regional economic and cultural development. Going back to the origin of music, Xinjiang is mainly influenced by the Chinese music system, the Persian-Arabic music system, and the European music system. Therefore, the folk music of the Xinjiang ethnic group has the characteristics of these three systems. Natural minor, harmonic minor, mixed Lydian, and Dorian are the most commonly used modes in European music systems. Ding Shande's "Second Xinjiang Dance" uses the Dorian mode in the European music system, and the main tone is the tone. This ancient European mode presents a new look in the process of combining with the traditional mode of Xinjiang folk music and has been further inherited.

The piano pieces "Spring Dance" and "Second Xinjiang Dance" occupy an irreplaceable position in the history of Chinese piano music with their respective artistic charms, showing the strong "regional flavor" of Xinjiang. By imitating hand drums, it shows the dynamics of drum beats and reflects the humor of Xinjiang people in the vast Gobi desert and the oasis with lush water and grass; it conveys from the tune that Xinjiang is vast and sparsely populated, and the harsh living environment determines Xinjiang. People must rely on each other and help each other to survive the heroic, magnificent, and helpful regional characteristics; from the mood of the work, it shows the prosperity brought by the Silk Road and the colorful regional cultural characteristics of the fusion of Chinese and Western cultures.

5. Conclusion

Musical culture has a direct origin in human life and production activities and methods, and regional differences affect this way of life. For people living in the same area, the natural environment is the same, and the ideas derived from the ideas acting on the human heart are also similar. From another perspective, aesthetic concepts and personality traits in turn prompt people to make different choices about their environment. Therefore, the musical cultural events bred by the above factors have typical regional differences. There is a strong link between regional culture and music. The production and development of music are based on the time and space of a certain region, reflecting the cultural characteristics of the region.

Xinjiang has a long regional history, has a unique geographical location, plays an important role, and has experienced multiparty integration in cultural development, and under the joint action of these factors, a characteristic regional culture with Xinjiang style has been formed. Oasis culture is a cultural orientation that Xinjiang people have always admired, and it is also a characteristic product of Xinjiang's regional culture. It represents the optimistic ideology and spiritual outlook of the Xinjiang nation. This humanistic culture has created a strong sense of rhythm and dance style in Xinjiang music. From the perspective of these musical works regionally, it is not difficult to find that the piano works in the Xinjiang genre and style have significant regional characteristics in terms of rhythm, rotation, rhythm, and other musical ontology, which is unique in Xinjiang. Regional culture is the soil for the production of musical works, providing a material basis for music creation. Music can promote the development of regional culture, and with music as the carrier, regional culture can be promoted. As a result, there is a coexistence between regional cultures and music, interdependent. The long history and culture

Research Article

Medical Health Data-Driven Physical Education Scheme: Public Environment-Oriented Exercise Health Management

Nan Yue [ID]

College of Physical Education, Beihua University, Jilin 132013, China

Correspondence should be addressed to Nan Yue; yuenan@beihua.edu.cn

Smart wearable devices can encourage users to take an active part in exercise to a certain extent. The most important reason is that their entertainment function can bring users a better exercise experience, which is also one of the reasons why most people wear smart wearable devices during exercise. Another reason is that the medical and health data feedback of smart wearable devices can play a stimulating role, which is also the motivation of this study. Through the feedback of health data, students can perceive their own exercise situation, and teachers can plan more targeted exercise courses based on medical and health data, so as to improve the quality of physical education. This paper studies the origin and development of health data-driven learning; clarifies the logical mechanism between health data-driven learning and physical education; analyzes the internal needs of physical education design; discusses the characteristics of thinking, process, tools, and other elements of health data-driven learning in the new era of physical education reform; and carries out physical education teaching practice. Experiments have proved that health data-driven physical education is beneficial for improving students' emotional attitude and values, optimizing learning process and methods, and strengthening knowledge literacy and exercise skills. However, in today's poor public environment, the medical and health data-driven physical education scheme proposed in this paper is also applicable to the public-oriented exercise health management. Medical Health; Public Environment; Health Management; Data Analysis.

1. Introduction

The physical health level of students is directly related to the development of society, the future of the country, and the future of the nation. However, in recent years, the national student physical health monitoring shows that the physical health of Chinese students has been declining yearly, mainly manifested as a low vital capacity index, obesity, myopia, and poor stamina [1–3]. There are many ideas to solve students' physical health problems, but the key point is to start with physical education. This is because the main exercise time and space of students are in the school, while improving students' health is also the primary goal of physical education.

As an important component of school teaching system and the central position of school sports work, physical education has many functions such as guiding students to form good habits, exercising strong physique, developing sports skills, and shaping strong character [4, 5]. Under the background of modernization of education and acceleration of digitalization of sports in the new era, systematic promotion of physical education teaching reform in schools bears an important historical mission and social responsibility [6–8]. To improve the intelligence level of physical education teaching, it is necessary to further strengthen the sports teaching reform and innovation, make full use of and integrate the modern information technology, analyze and use data efficiently, actively promote the application practice of data-driven learning in physical education in schools, and promote the two-way integration of physical learning and physical education to achieve new results. In the era of rapid development of science and technology, distance teaching and multimedia teaching have been widely used in the teaching of various subjects and have achieved remarkable results. Therefore, we can also apply them to physical education teaching. Intelligent distance multimedia physical

education not only provides great help for teachers and students, but also stimulates students' interest in learning physical education.

As wearable device technology is getting to be more mature, all kinds of wearable device products will enter the commons' daily life. At the same time, the rapid expansion of smart medical care and mobile medical care makes the application prospect of wearable devices in the medical and health field broader [9–11]. It is the increasingly extensive application of wearable devices in the field of medical and health that makes the health data-driven physical education scheme possible. Health data-driven is an inevitable choice for the development and reform of physical education in the new era [12, 13]. First, with the constant emergence of newly developing information technologies such as social media and iteration, the new era of digital development has brought new opportunities for the teaching reform of physical education innovation, making health data-driven learning and integration development a new trend of physical education. The innovation of student-oriented and student-friendly teaching mode driven by health data not only strongly supports the concept of student-centered education, but also fully exerts the significant advantages of health data-driven learning in reducing teaching costs, improving learning efficiency, and consolidating learning quality. Afterwards, health data-driven learning is a favorable way for the development of physical education. By effectively recording and feeding back the health data of the development of students' sports ability, students can participate more in sports learning and have a stronger sense of experience, which is conducive to the formation of deeper knowledge understanding and cultivation of reflective learning ability and promotes the qualitative change of sports learning. Finally, health data-driven learning is an innovative step in the development of physical education. A large number of practices have proved that health data-driven learning consolidates and strengthens physical education teaching through online and offline learning; effectively guarantees learning opportunities and learning fairness; and develops diversified teaching organizations, personalized teaching evaluation, three-dimensional teaching content, and other ways to reflect the multidimensional goals of education.

As the inheritance and sublimation of digital learning and mobile learning, health data-driven learning emphasizes the use of technology as a cognitive tool rather than a teaching tool to make learning more flexible and inclusive. With the extension of teaching paradigm from experience imitation to data-driven teaching, the systematic connection of curriculum system, the teacher-student interaction and integration, the evaluation and supervision of academic quality, and the reasonable creation of teaching situation in physical education need the help of health data-driven technology. However, with the development of China's economy and society and the advancement of urbanization, citizens pay more and more attention to the quality of life, and urban public environmental health has begun to attract public attention. Whether the health data-driven physical education scheme is suitable for public environment-oriented exercise health management will also be studied in this paper.

The remainder of the paper is structured as follows. Health data-driven-oriented innovation in physical education is studied in Section 2. In Section 3, practice and effect of health data-driven physical education are discussed. In Section 4, the development of health data-driven physical education is studied. Finally, the conclusion of this paper is given.

2. Health Data-Driven-Oriented Innovation in Physical Education

2.1. Health Data-Driven Thinking-Guided Innovation of Physical Education. Health data-driven physical education is not to reconstruct the teaching mode but is a process of integrating and optimizing sports skill teaching with technical tools. According to the theoretical framework of data-driven learning, the health data-driven physical education teaching model takes the teacher-student community as the main body, closely revolves around the basic structure of physical education classroom teaching, and fully exerts the four functions of data (Figure 1), in which the teacher-student community is the dual subject composed of teachers and students and resources, teaching, and experience construct the whole process of optimization and improvement of physical education teaching cycle in school during data-driven process.

The teacher-student community is not only the direct stakeholder of physical education teaching under data-driven learning, but also the executor of the teaching model [14, 15]. Under this framework, teachers make preparations based on the health data acquired by wearable devices. In other words, teachers are the subjects of health data collection and health data analysis. Students finally realize sports behavior change based on experience and are the object of health data decision-making and feedback. This model can promote the meaningful dialogue between teachers and students and the concerted action based on common goals, and it can accelerate the construction of democratic, equal, interactive, harmonious, and dynamic teaching atmosphere. Through health data-driven physical education, students can self-regulate their learning activities and acquire all kinds of learning resources on demand, which can promote the reconstruction and definition of the community of teachers and students in school physical education curriculum and enhance the relationship between teachers and students to return to the intrinsic nature.

2.2. Health Data-Driven Process-Guided Innovation of Physical Education Strategy. Health data acquisition, health data analysis, health data decision-making, and health data feedback constitute the power chain of health data-driven physical education. Health data acquisition is the foundation, health data analysis and health data decision-making are the key, and health data feedback is value presentation.
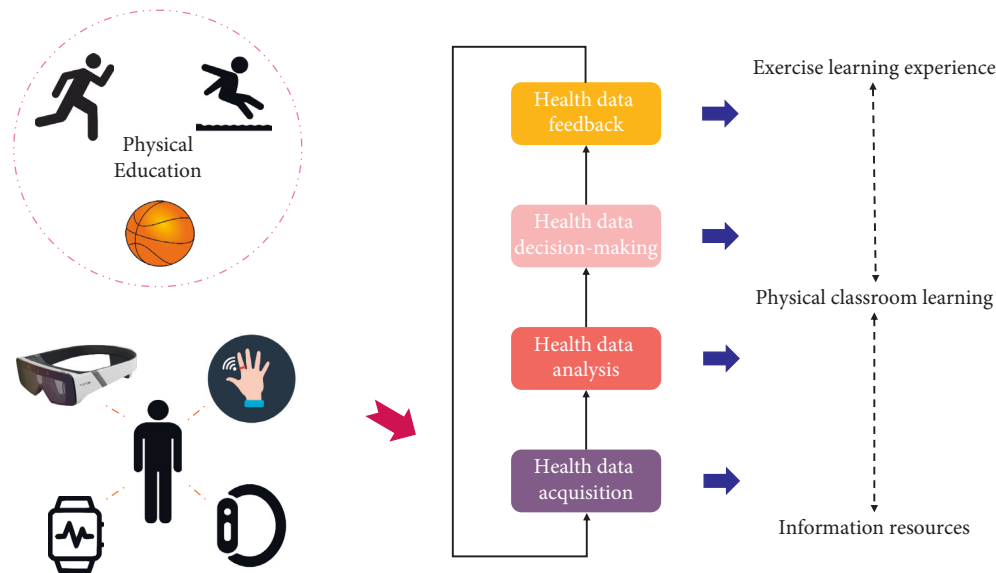
FIGURE 1: Framework of health data-driven physical education scheme.

Medical health wearable devices refer to portable electronic devices which are used in daily life, exercise, health maintenance, and clinical medical activities and can be directly worn on the body or implanted into the human body [16–18]. They can sense, record, analyze, regulate, intervene, and even treat diseases and maintain health status through software support and data interaction. Medical health wearable devices are applicable to a wide range of people, with various types and complete functions. They not only have the functions of step counting, tracking daily activities and dietary habits, monitoring vital signs, and drawing electrocardiograms in real time, but also can monitor the health status of patients in real time and multiple dimensions. Health data acquisition refers to the process where wearable devices users collect personal identification data (height, weight, gender, date of birth, etc.), physiological data (blood sugar, blood pressure, heart rate, body temperature, etc.), and surrounding environment data (noise, temperature, humidity, pollution index, location, etc.) through sensors and circuit chips during medical health activities [19, 20].

The health data-driven dynamic chain is helpful in the overall consideration of the order of teaching contents, the procedure of teaching activities, the form of teaching organization, the use of teaching methods, and the utilization of teaching resources by strengthening the existing structure of physical education teaching activities. By obtaining more information of physical education status, it is beneficial to distinguish the subjective and objective conditions and status of teaching, especially the individual differences, and then realize the order and operability of teaching. At the same time, compared with the closeness of traditional physical education teaching, health data-driven learning pays more attention to the openness of physical education [21]. Through visual and data-based sharing of teaching information, it promotes communication and cooperation between subjects and objects, strengthens the deep body experience, highlights the individual characteristics of self-body perception, promotes the subjectivity in the learning process, and better exerts the initiative of learning [22, 23]. Health data-driven learning ensures the process management of teachers' teaching supervision in physical education and makes teachers' guidance play a better role, so as to realize the purpose of teaching students according to their abilities and innovation of physical education strategies.

2.3. Health Data-Driven Tools-Guided Innovation of Physical Education Methods. Health data-driven physical teaching has the advantages of planning process, adjusting rhythm, and expanding space. In the preparation part of physical education, it is helpful to optimize and promote the students' self-study behavior by sorting out the knowledge content carefully, decomposing the knowledge content, and realizing the individualized setting of learning objectives [24]. It is also helpful to make rational decisions to realize the learning task goal by dividing the learning points, helping the students to do a good job in exercise learning, and gradually crossing the stage platform period of exercise ability development, thus cultivating the lifelong exercise awareness [25]. At the same time, stereoscopic content recognition is conducive to opening the teaching boundary of physical education and promoting the integration of internal and external classroom. In the basic part of teaching, through real-time monitoring and acquisition, analysis of physical and mental state, and targeted guidance of teaching supervision, it is helpful to strengthen quality control and adjustment of students' physical education learning process, to achieve rational planning of learning task exercise through scientific training guidance and supervision, to help students strengthen physical exercise action and to consolidate their mastery of new knowledge and skills. Diversified teaching interaction also helps and supports flexible sports teaching and provides a multi-integrated form of full

participation in learning. After physical education teaching, the learning effect will be accurately assessed by timely monitoring, analysis, and evaluation of learning quality and progress. In this way, it can assist students in developing reflective thinking and self-awareness [26]. It is necessary to make up for the limitations and shortcomings of body experience and realize the standardization and unification of teaching methods and learning methods, so as to generate positive interaction between body cognition, alternation of learning and practice, and skill formation, thus realizing the innovation of physical education teaching methods with the help of information technology.

3. Practice and Effect of Health Data-Driven Physical Education

3.1. Practice. For health data-driven physical education, emotional attitude and values are the internal motivation of learning, process and method are important links of learning, and knowledge and skills are the specific embodiment of learning ability and learning results. The study was divided into three groups: experimental group 1 (E1), experimental group 2 (E2), and control group (C1). Among them, E1 and E2 were health data-driven physical education courses conducted with wearable devices, with 20 subjects in each group. The difference between them is that the subjects of E1 is students, while E2 is exercise health management for public environment; that is, 20 citizens are randomly selected for participation. In C1, 20 subjects were randomly selected for traditional physical education without health data. Without affecting the teaching order, the whole experiment lasts 8 weeks and takes long jump once a week to compare the actual effect of health data-driven physical education with traditional teaching so as to prove the feasibility and effectiveness of health data-driven learning in physical education.

In the data acquisition process, electrocardiography (ECG) of E1 and E2 was collected. It is a time-based recording of the electrophysiological activity of the heart through the thorax to help diagnose arrhythmias, myocardial ischemia, myocardial infarction, etc. and to improve the safety of physical education. Pulse, blood pressure, blood oxygen, skin temperature, and body temperature of E1 and E2 were also collected. In addition, physical education mainly detects exercise, including automatic recognition, tracking, and energy consumption. Through real-time analysis of data collected by E1 and E2, the subjects were given targeted physical education. In the data decision-making process, retrospective comparison method [27] was used. Data feedback uses teaching feedback card and development record table. Each of E1 and E2 subjects receives the last class teaching feedback card before class, including key action screenshots, key action data, medical health data, teachers' evaluation and suggestions, and students' self-evaluation and thinking. Data for eight consecutive weeks are finally summarized and fed with technical action development record table, which is finally evaluated by the teachers. The control group was taught in traditional mode without data analysis and feedback. Teaching and evaluation

are carried out by teachers with senior titles and more than 10 years of teaching experience. Before and after the experiment, three groups are surveyed with questionnaires on learning evaluation status and evaluated with long jump results. The learning progress and learning content of E1, E2, and C1 are synchronized, and their specific performance is shown in Table 1.

3.2. Practice Results and Analysis

3.2.1. Health Data-Driven Physical Education Helps Promote Students' Emotional Attitudes and Values. As the result data of the long jump is fed back to the students regularly, combined with their own graphics and movement evaluation and analysis, it not only triggers the students' self-thinking, but also provides a basis for the adjustment of the practice goal in the next class, which effectively mobilizes the students' learning enthusiasm, strengthens their motivation, and stimulates their motivation. Stimulated by successful experience, slight but definite progress increases students' confidence, interest in learning, and desire for knowledge and actively exerts willpower to overcome side effects such as uncomfortable actions and unclear points caused by adjustment, so as to improve the effectiveness of the classroom and improve students' willpower quality simultaneously. Additionally, by analyzing the collected health data, teachers may determine whether students' exercises are standardized or tolerated by their bodies, allowing them to guide students to finish movements more scientifically and develop targeted physical education courses for students.

Although there are no significant differences in other indexes, the correlation indexes have mutual effects; for example, E1 and E2 are higher than C1 in the indexes of "physical ability," "number of participation activities," and "confidence level." The overall results of E1 and E2 in the final assessment are better than those of the control group. Under the collaboration of common data, students acquire more obvious experience through health data-driven learning. Small changes of individuals gradually shape the overall environment in the process of gradual unification. The formation of a good learning atmosphere is also more conducive to the consistent growth of ability. Students enjoy gaining good experience in the process. The research shows that health data-driven physical education is more conducive to the development of students' attitude awareness and improvement of self-efficiency under the progressive processing of information.

3.2.2. Health Data-Driven Physical Education Helps Optimize Students' Learning Process and Methods. By observing the process records, it was found that "shared language" and "shared movement" gradually appeared in the middle and later stages of the experiment. The appearance of "shared language" indicates that students' emotions have changed and resonated with each other, which is externally expressed as the desire to improve their scores, leading to the appearance of "shared movement." "Shared language" and "shared movement" jointly lead to a change in students'

TABLE 1: Performance of E1, E2, and C1 in health data-driven physical education.

Whether wearable devices affect learning	Average training time (one week)/h	Grade improvement (%)	Times of training	Confidence level (1–5)
No	1.56	38.06	1	4.61
Slightly	2.47	21.59	2	3.16
—	3.07	—	>3	2.09

exercise behavior. The students' recognition of movement is not only reflected in their own movement, but also in their concern for others' movements. Specifically, E1 is significantly higher than E2 and C1 in the frequency of observing and imitating others' long jump behavior. Especially in E1, a small discussion group of 2-3 students will be formed to compare and correct each other's technical actions. It can be seen that the health data-driven physical education affects students' way of thinking and communication and improves students' sense of identity to physical education through the sharing of common data.

Compared with traditional teaching, health data-driven physical education teaching creates a free physical education learning space for students, improves the way of students' physical education learning, and makes physical education classroom teaching more dynamic. Students are endowed with more autonomy in class. While accepting the "charm" of data, students are driven by health data, which further stimulates the freshness of students' exploration and their strong desire to keep trying [28]. Health data-driven physical education makes the use of teaching methods and means gentler for physical education teachers. Teachers can guide and control the classroom more freely and have more time to teach according to their aptitudes. As a result, classroom efficiency has been significantly improved. The role of teachers in the classroom has really become a cooperative role because of technological innovation [29, 30]. Teaching relationship is more democratic, more equal, and closer to the development trend of modern education.

3.2.3. Health Data-Driven Physical Education Helps Enhance Students' Knowledge and Exercise Skills. The results of expert technical evaluation further showed that E1 and E2 had better technical movements than C1; were higher than C1 in the overall level of long jump skill learning, technical standardization, and skill evaluation; and had a higher proportion in high sections than C1. Moreover, the technical movements of E1 and E2 are more accurate, standardized, coordinated, and effective. Through further observation of the process record, it is found that C1 has always been in a "wavy" progress and high uncertainty in the overall development, while E1 and E2 are in a steady upward trend and in an "adjusting state" of steady growth. In the mode of health data-driven physical education, students can test and practice in a planned and targeted way in each lesson, thus achieving higher learning quality and significantly improving the acquisition of sports knowledge and the strengthening of exercise skills. Although the experiment period is not long, from the perspective of quality development, health data-driven physical education can relatively

shorten the process of finding "problem state," accelerate the learning process, further strengthen the combination of inside and outside class, improve the learning efficiency, and ultimately benefit the improvement of students' ability.

4. Development of Health Data-Driven Physical Education

4.1. Reshaping the Structural Relations of Physical Education Classroom Teaching Comprehensively by Quantitative Means. Quantitative means provide an analytical perspective and action basis for health data-driven physical education teaching. At present, the tracking and analysis technology of health data has been preliminarily applied in indoor physical education teaching by means of network or intelligent teaching system platform [31, 32]. This analytical technique generally includes three levels: technology, method, and application. On the technical level, the wearable devices and noncontact sensor technology can obtain real-time and non-real-time data on students' learning state, physical and mental performance, etc. Offline and online mathematical modeling technology can discover the fine construction process of discrete and nonlinear exercise and health knowledge of students in ability development stage and finally depict the development process of exercise with intuitive data visualization technology. On the method level, hybrid research methods combining dynamic process progress with static result state can deeply understand complex phenomena in exercise learning, perspective causes of exercise knowledge and skills, socioeconomic methods of macroscopic overall physical health and micro individual skill development, etc.; diagnose problems restricting the development of exercise ability according to learning style, behavior preference, and other factors; and then plan a learning path that meets the needs of the students. On the application level, the characteristics of physical education are reexamined from different subject perspectives according to the objectivity of health data, the laws of physical education are retraced from different time dimensions according to the continuity of health data, and the influence of physical education is reevaluated from different observation scales according to the scale of health data. Ultimately, the health data-driven physical education teaching with quantitative means provides teachers with comprehensive and whole-process teaching services and supports students to learn accurately, individually, and systematically.

With the important goal of improving physical education, effective and interactive exercise teaching mode is restricted by individual differences, diversity of exercise, instantaneity of exercise behavior, and subjectivity and

objectivity of teaching. Teacher's control of teaching stays in a certain section and can only focus on students' limited physical behaviors. Most of the teaching process is dominated by visual observation, verbal communication, and skill evaluation, which easily leads to inadequate feedback and lack of communication [33]. The data cognition realized by data tracking redefines the teaching process with the help of abundant health data information. The flexible reorganization of the teaching process becomes reasonable and dependable, presenting the characteristics of dynamic process, in-depth monitoring, and intelligent regulation. Teaching is no longer limited to the preset static teaching design but can be carried out dynamically according to different people, circumstances, and materials. The objectives of physical education and the all-round development of students' personality are better realized, and a new form of effective physical education is established. Therefore, health data-driven physical education relies on a comprehensive and integrated teaching analysis process to strengthen the communication between teachers and students and restructure a new type of teacher-student relationship and classroom form.

4.2. Innovation of Decision-Making Model to Improve the Effectiveness and Quality of Physical Education Teaching Objectives. The decision-making mode determines the operational logic and objective thinking of health data-driven physical education. As a new teaching mode in the information age, the current health data-driven physical education teaching emphasizes problem-oriented more. With the objective presentation of health data, it causes students to think about the teaching situation; encourages students to learn and master systematized, structured, and standardized exercise knowledge and skills; and conforms to the cultivation concept of core quality of exercise discipline. Teachers should adhere to the concept of student-centered and technology-supported learning to provide students with more modern learning experience, improve students' information literacy, broaden students' vision of exercise and health, and improve the scientific and effective teaching. In the process of changing from experience-driven to health data-driven education, teachers need to have high data literacy, mainly reflected in the application of data to improve the knowledge base, thinking habits, and action ability of teaching [34]. However, teaching and learning are two-way interactive processes, and both teachers and students are interdependent and grow together. Under the guidance of health data perspective, the community of teachers and students focuses on specific exercise practice problems. Through scientific data mining, analysis, communication, and evaluation, it jointly explores reasonable and effective teaching decisions to deal with various problems, realizes simultaneous development, and finally achieves the goal of educating people by virtue.

With the deep integration of health data-driven learning and physical education, the existing teaching status will undergo subversive changes, and health data will gradually become the core label of new physical education. Exercise

teaching needs to break the traditional ideas, and every member of the community of teachers and students needs to study and develop the corresponding data quality, including health data acquisition and data analysis. Health data-driven physical education not only realizes the orderly transformation of "health data-information-knowledge-skill," but also realizes the communication and cooperation between members based on common language. Therefore, health data-driven physical education needs to rely on the two-way teaching interaction between teachers and students, so that the goals between teachers and students are more consistent; at the same time, the communication is more smooth, the community of teachers and students in physical education is more closely integrated, and the cultivation goal of core literacy of physical education is more effective and of high quality.

4.3. Health Data Feedback Promotes the Innovation and Development of Physical Education Concept. The feedback of health data reflects the core idea and future trend of health data-driven physical education. The key to achieving this requirement lies in the normal application of education and teaching and comprehensive innovation. A large number of experiences also show that physical education teaching needs to strengthen the combination with modern information technology, multimedia technology, and other fields to encourage students to form necessary exercise information literacy, sharp exercise information collection literacy, modern information technology communication ability, and necessary scientific and technological literacy in exercise learning [35]. Through the comparison of health data feedback, the students can individually and adaptively locate the best learning partners, thus optimizing the communication space among the community of teachers and students and accelerating the construction of students' equal exercise knowledge and ability. The continuous and consistent positive feedback of health data can help students form active exercise learning attitude, acquire basic knowledge and skills of exercise disciplines, and at the same time form correct exercise values, which also become the driving force for integration and innovation of physical education.

Superficially, health data-driven physical education continues to maintain the basic process structure of the course, but the support services achieved by health data feedback have been embedded in various physical education links. During the process of health data feedback, the advantages of health data in classroom teaching can be brought into play through data integration of various means, so that periodic accurate feedback exists in the whole process of learning, which changes the black-box learning mode of preschool test and post-school evaluation. Students can self-evaluate and improve, as well as understanding themselves from health data to optimize their learning strategies, methods, and abilities. Therefore, health data-driven physical education relies on periodic and whole-process health data feedback and carries out physical education reform from teaching mode, learning evaluation, educational decision-making, and learning quality, bringing opportunities and new life for physical education reform.

5. Conclusion

This paper studies health data-driven learning to promote the innovation and development of physical education teaching; constructs a health data-driven physical education teaching model; strengthens the collection, analysis, feedback, and utilization of data; and explains the specific ways of learning support design in each link based on health data in order to realize the deep integration of health data and physical education. Empirical study shows that health data-driven physical education teaching has a good effect on improving students' emotional attitudes and values, learning process and methods, knowledge and skills, etc. Furthermore, it is also helpful in the health management of the public environment. In the future exploration and development, the application of health data-driven learning-oriented innovation in physical education needs theoretical and practical two-way driven and comprehensive interpretation. It still needs to be tried in concept, method, technology, and means to provide rich theoretical guidance and practical reference for optimizing physical education teaching mode, providing strong support for comprehensively deepening the reform and innovation of physical education, and realizing the modernization of physical education.

Data Availability

All data used to support the findings of the study are included within this paper.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this paper.

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Hindawi

Retraction

Retracted: A Preliminary Study on the Dramatic Factors of Ancient Chinese Poetry under the Changing Geographical Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] Y. Liu, "A Preliminary Study on the Dramatic Factors of Ancient Chinese Poetry under the Changing Geographical Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 4220059, 9 pages, 2022.

Hindawi

Research Article

A Preliminary Study on the Dramatic Factors of Ancient Chinese Poetry under the Changing Geographical Environment

Yanfang Liu ⓘ

School of Communication, Shanxi Normal University, Taiyuan 030031, China

Correspondence should be addressed to Yanfang Liu; 20210120@sxnu.edu.cn

The formation of Chinese traditional culture is influenced by many factors, and the natural geographical environment is an important factor. Because a country's status is based on its geographical environment, it affects many aspects, such as economic composition and national psychology. As one of the expression forms of traditional Chinese culture, ancient Chinese poetry has a great influence on the emergence and development of Chinese traditional culture. Therefore, this paper mainly discusses the specific influencing factors of the drama of the ancient Chinese poetry, and the preliminary study of it is of certain significance to the development of Chinese traditional culture.

1. Introduction

The genre of quatrains was finalized in the Tang Dynasty and developed almost to perfection [1]. Tang Dynasty poets not only used quatrains to describe scenery and objects but also overcame the limitation of short quatrains and used superb artistic generalization to write people in quatrains [2]. Some masterpieces can even display situations, plots, and scenes similar to drama literature in a limited space discourse [3]. It can be said that there are not only "paintings" in poems and "people" in poems but also "plays" in poems. Various literary styles always influence and penetrate each other [4]. Quatrains have been recited in the population for a long time, and they are appreciated by both the refined and the popular [5]. Discussing their dramatic factors has a certain significance for the initial study of the dramatic factors of ancient Chinese poetry under the changing geographical environment and deserves due attention.

A nation forms a stable national culture, and its influencing factors are multifaceted which include political system, economic foundation, and natural environment. Among them, the natural geographical environment occupies an important position [6] because the place where a nation stands is based on its geographical environment and it affects many aspects such as economic composition and

ethnic psychology [7]. The reason why Chinese traditional culture can be maintained for a long time is that it will not be interrupted like other ancient civilizations and it has formed a Chinese culture dominated by farming culture, a small-scale peasant economy that is economically self-sufficient, and a conservative and closed national psychology. The natural geographical environment is inseparable [8].

In terms of geographical environment, the scope of the traditional Chinese regime is relatively fixed. The main scope is roughly the west of the Pacific Ocean, east of the Qinghai-Tibet Plateau, north of the South China Sea, and south of the Mongolian Plateau, which is the "Huaxia" in history, which also constitutes China [9]. Among them, the most stable ruling area is south of the Yinshan Mountains and the middle reaches of the Liaohe River and the Qinghai-Tibet Plateau and the east of the Hengduan Mountains in the mainland of China [10]. It is concentrated in the middle and lower reaches of the Yellow River and the middle and lower reaches of the Yangtze River [11]. This part of the territory also constituted the original cradle of the Chinese nation. It can be seen that this part of the region is mainly located in the northern temperate zone. This part of the region has a warm climate and fertile soil, ideal for agricultural development [12]. Located in the interior of the Eurasian continent, the area is closed, less subject to external intrusion,

and cultural traditions can be continued. It has had a significant impact on the emergence and development of Chinese traditional culture [13]. As an indispensable part of Chinese traditional culture, ancient poetry and its natural geographical environment also have a profound influence on its development and cultural evolution.

2. Natural Geographical Environment

Under different natural and geographical environments, the forms of folk songs are also different, as shown in Figure 1.

2.1. The Influence of Natural Geographical Environment on the Formation of Chinese Poetry. Throughout the development history of human civilization and culture, we can see in Figure 2 that those great civilizations in ancient times were mostly concentrated in the river basin, which is called "the river civilization."

In ancient China, the topography of the middle and lower reaches of the Yellow River and the middle and lower reaches of the Yangtze River was flat and dominated by plains. The climate dominated by the north temperate zone is warm and humid, with abundant water sources and rain and heat in the same season [14]. At that time, the Loess Plateau was still a forest. Under such unique conditions, agriculture developed rapidly and it became the initial cradle of Chinese civilization [15]. Many modern archaeological documents and archaeological discoveries have confirmed that the central areas of ancient civilizations such as Xia, Shang, and Zhou were the central and northern parts of today's Henan Province, southern Shanxi Province, the Guanzhong Basin in Shaanxi Province, the southwestern part of Hebei Province, and the western part of Shandong Province. It was also the region with the most favorable natural environment at that time. Ancient Chinese ancestors lived and multiplied on this land [16]. The soil blown from the western plateau allows the nutrients of the land here to be replenished every year, instead of abandoning and looking for other land every year, the sustainable development of agriculture is guaranteed, agriculture is developed, and various farming tools appear very early [17]. Then, it is not surprising that advanced farming civilization appeared in the Central Plains. The economic, demographic, and geographic foundations for the emergence of Chinese culture are already in place. Since then, China's ancestors have worked on this land for generations, forming the initial prototype of Chinese civilization. Before the emergence of industrial civilization, we observe that which country is the most developed agricultural economy and which country is the most powerful. With the support of China's geographical location, China's agricultural civilization has always been very developed, and it has always occupied a far leading position in the world [18].

Natural ecology is inextricably linked with ancient Chinese poetry. Ecological environment is the basic place on which human beings survive and develop, and it also provides the best opportunity for ancient poets' literary creation and an important content of literary performance.

A large number of various natural scenery, animal, and plant images into poetry make ancient poetry present "green," vibrant characteristics, for readers to show a colorful ecological picture scroll. At the same time, the poetry creation of ancient poets makes the ecological things that originally belong to nature into people's aesthetic cultural vision, thus attaching a strong human culture and poetic color."

2.2. The Natural Geographical Environment Enables the Development and Continuation of Chinese Poetry. With the development of agriculture, the Chinese nation can no longer be satisfied with the land in the Central Plains. Therefore, in the ancient poetry at this time, the characteristics of various nationalities and different geographical environments began to appear [19]. Although the development speed is relatively slow, Chinese poetry has been developing forward with the support of agricultural economy. From the perspective of surrounding and external, China's geographical environment has effectively guaranteed the continuation of Chinese poetry [20]. To the east of the territory is the Pacific Ocean, to the south is the South China Sea, and to the west is the Qinghai-Tibet Plateau. This will completely surround China. The barrier of the natural geographical environment makes this area rarely invaded by foreigners, which provides an external guarantee for the development of culture. At this time, only the north had no security and it was exposed to the nomads in the north, which posed a great threat to the survival of the entire civilization. This is indeed the case in history. In the case of underdeveloped transportation in ancient times, various powerful empires in the distance could not quickly reach China and conduct wars. Most of the harassment suffered in China's history came from the north. The rulers of China thought of a way to build the Great Wall. In this way, China's four conveniences have barriers. Such a historical background and geographical environment characteristics also promote the prosperity of contemporary poetry.

Ancient Chinese poetry is inextricably linked with the natural ecology. The vibrant and colorful ecological world is the best opportunity to inspire the poetry of ancient poets and constitutes an important content of their literary expression. Various kinds of mountains, rivers, natural landscapes, and animal and plant emotions have entered the poet's pen and become a series of colorful poetic images. Ancient poems are "green" because of these natural images, showing readers a colorful ecological picture scroll. At the same time, natural images also enter people's aesthetic cultural vision because of the poet's attention and aria, thus attaching the color of human culture, poetic, and even personification in addition to their own natural attributes. In the ancient Chinese aesthetic culture tradition, some natural objects such as plum and bamboo carry the profound psychological accumulation and rich humanistic emotion connotation of the Chinese nation. The marriage between ancient poetry and natural ecology makes them complement each other.
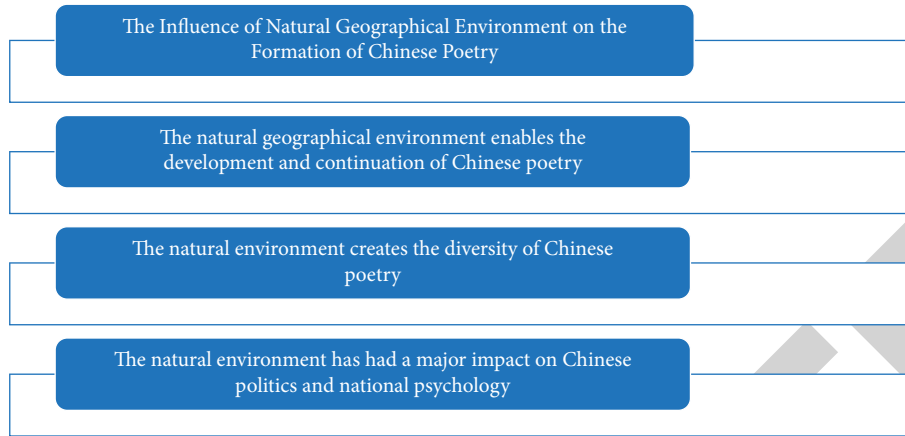
Figure 1: Natural geographical environment.
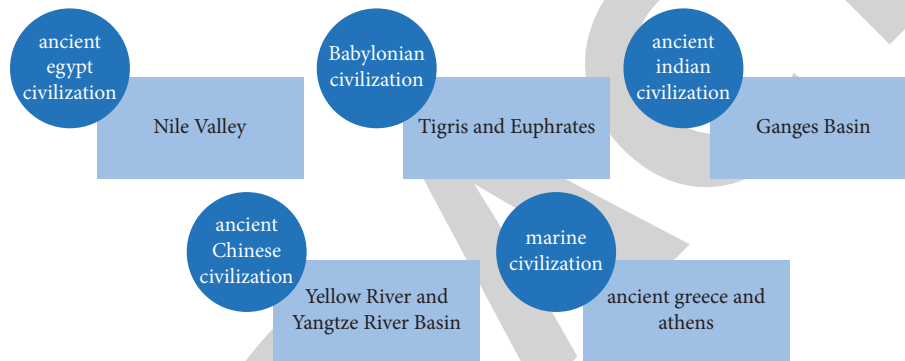
Figure 2: Forms of ancient civilizations in the world.

2.3. The Natural Environment Has Created the Diversity of Chinese Poetry. The vastness of China's territory has been maintained, which is also rare in the history of the world. Such a vast territory has extremely diverse topography, including mountains, rivers, plains, and plateaus. Traffic in ancient times was inconvenient, and such terrain was likely to create an insurmountable barrier. There is a lack of communication between various cultural areas, and the differences are becoming larger and larger, resulting in the formation of cultural styles with different characteristics, as shown in Table 1.

Another example is that due to the barrier of the Hengduan Mountains, the transportation between ancient Sichuan and the Central Plains was very inconvenient, so it was called "natural danger." Judging from the Sanxingdui cultural relics excavated by archaeology, the bronze ware technology in the ancient Sichuan Basin was extremely developed and the stratum system was also different from that in the Central Plains. In Lingnan, further south, the difference is even greater. Due to the proximity to the ocean, frequent exchanges with the outside world, and the difficulty of reaching the control of the Central Plains dynasty, the culture here is relatively open and people's concepts are also very different from the Central Plains tradition. It is not surprising that China's early foreign trade and opening of ports occurred in Guangdong Province. It is this diverse natural and geographical environment that has created such

different cultures of various ethnic groups and regions, which makes Chinese poetry present a splendid feature. The degree of cultural diversity is also amazing in the world.

Ancient natural environment beautiful, diverse ecological conditions constitute a good background of the poet creation, poets capture all kinds of natural poetry, and poetry language is no longer just an abstract symbol, we can see the colorful ecological world and vivid harmony between man and nature. The rich and colorful green ecological factors in nature enter people's poetry, making the poetry "green," and the picture presented by the poetry becomes more gorgeous and colorful.

2.4. The Natural Environment Has Had a Significant Impact on Chinese Politics and National Psychology. Such a geographical environment has played a certain role in blocking external aggression, but it has also resulted in the super-stability and isolation of Chinese politics and the arrogance and conservativeness of national psychology. If there is no crisis caused by external invasion, a dynasty can basically continue relatively smoothly. Changes of dynasty are infrequent. Moreover, the political system will not change much. Political stability creates cultural stability. The mainstream of China's feudal culture for more than two thousand years is Confucian culture, which lacks changes. They were proud of their abundance of products and

TABLE 1: Differences in culture between north and south caused by changes in geographical environment.

The cultural consistency of the north is relatively strong	The southern cultures have their own characteristics
In the central and northern regions of China, poetry represented by the "Book of Songs" appeared. It is characterized by elegance and gentleness, in line with etiquette, and with realism as the main feature	In the south, poems such as "Li Sao" appear, which are very different from the Book of Songs, showing a blurred and magical romantic color

considered themselves "the kingdom of heaven," which resulted in political stagnation and lack of progress. It is reflected in the national psychology that this safe environment makes the people comfortable with the status quo and cling to the farming economy. In traditional Chinese concepts, family, clan, and blood ties are particularly valued, and they are inseparable from the development of farming and economic development caused by the natural environment. "Relocating in a peaceful land" and "not traveling far away" are very important psychological concepts of traditional Chinese people. Unlike the western marine culture, which is full of changes and adventures, because of the superior natural environment, China has always been in a state of self-sufficiency, and the rulers and people are satisfied with the status quo. While the agricultural economy is stable, it also results in a conservative and autistic national psychology. In this context, contemporary poetry can also reflect the ethnic psychology of that time. For example, caused by the present natural scenery homesickness, pregnant, hurt yourself, or with the help of the natural scenery to abstract, difficult to directly say ideas in the long-term poetry creation practice gradually become a poetry generation mode, and many natural objects also gradually attached to the specific cultural psychological connotation and from generation to generation continue. We can pick up an ancient poem and almost always find some natural images. These images come from the natural ecological world, but also have a certain cultural significance.

3. Dramatic Factors in Tang Dynasty Quatrains

The heyday of poetry was in the Tang Dynasty in China, which was mainly influenced by the historical background and natural environment at that time, which made all the ancient poems of the Tang Dynasty show very dramatic characteristics. The dramatic factors in the poems of the Tang Dynasty are shown in Figure 3.

3.1. Dramatic Scenes in Tang Dynasty Quatrains. Due to the limitation of space, the quatrains of the Tang Dynasty often write lyrical emotions in concentrated scenes, so a situation similar to a drama often occurs: time, place, characters, events, and conflicts are very concentrated and reflected in the form of an instant. This dramatic situation is not only an opportunity for the outbreak of dramatic conflicts but also an objective condition for the characters to produce unique actions. In fact, in the quatrains of the Tang Dynasty, most of the characters that are prompted by this dramatic situation are "still actions" similar to the dramas, so what we see in the quatrains of the Tang Dynasty are mostly dramas similar to the "silence" or "pause" in the dramas situation. Readers can

also see the same situation in ancient Chinese drama literature.

The characteristics of dramatic situational concentration in the quatrains of the Tang Dynasty are very prominent. Good quatrain writers are particularly good at capturing moments to construct dramatic situations. Just as Ye Weilian said, "A lyric (lyric poem) often captures a moment of time that contains rich content," this moment contains events that imply the development of many lines before this moment, and there are many linear events that may develop at this moment. First, Tang Chinese quatrains often use moments to construct dramatic situations. In this particular moment, time, place, people, events, and conflicts are very concentrated. Table 2 lists where the dramatic scenes of Tang Dynasty poetry generally appear.

Compared with ordinary life situations, the biggest difference between dramatic situations is that it is an opportunity for the outbreak of dramatic conflicts, for example, Wang Changling's "The Resentment of the Bodhisattva": "the young woman in the boudoir does not know her sorrows and she puts on makeup in the spring. She suddenly sees the color of willows on the street and regrets teaching her husband and son-in-law to find a marquis. "Cuilou" and "Spring Day" by Yangliuqingqing on the street: the inner conflict between the young woman in her boudoir and the young woman's desire to "want her husband to find a lord" and her longing, who went upstairs alone, constitute a concentrated dramatic situation. Before this spring day, the young woman's thoughts were dominated by her "want her husband to find a title." Hou's heart, so at the beginning of the poem, she shows "no worries," even if she is alone, she "makes up on the green building" to appreciate the beautiful spring. But in a specific situation—"the color of willows on the street" "Inspired, she may have thought of the beauty and ephemeral nature of youth and spring, and the beauty of youth and spring that no one can appreciate . . .. so, the longing that had been lurking in her heart surfaced, and it was associated with fame and fortune." There is a strong conflict in the heart: "repent and teach the husband and son-in-law to find a lord," the specific situation finally prompted the outbreak of the dramatic conflict. Most of the dramatic elements in poetry are placed in the natural environment of the poet at that time, such as a tree or a building, which can reflect this dramatic color, so it can be seen that the drama of poetry is also influenced by the natural environment.

Tan Xusheng said, "The 'pause' in many excellent plays is full of drama; it is precisely because this static moment contains the rich and complex psychological content of the characters, which is even better than letting the characters use lengthy lines. The lines reveal the secret of the heart, which has a greater artistic effect. The author of the quatrain also constitutes a fertile poetic environment by depicting the
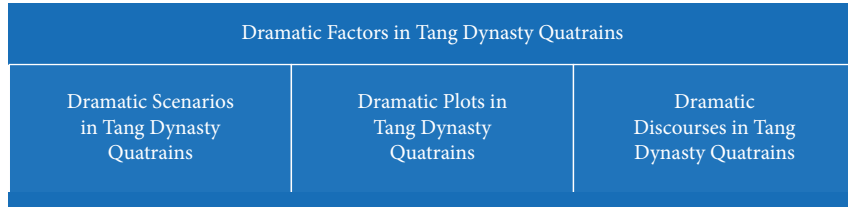
Figure 3: Dramatic factors in Tang Dynasty quatrains.

Table 2: Dramatic situations in Tang Dynasty quatrains.

Meng Jiao "Farewell to the ancients"	If you want to leave Lang Yi, where is Lang now? Don't hate returning late, do not go to Linqiong	The characters are the lyrical protagonist and the "Lang," the location is the two people's homes, the time is the moment of "wanting to say goodbye," the events are parting words, and the contradictions and conflicts are concentrated in the inner conflict of the lyrical protagonist. Secondly, this moment is mostly the moment before the conflict comes.
Wang Jian "Palace Ci"	The old courtyard was unbearable to repair, and the recent edict Xuanhui put up the building. Hearing that there is a new beauty entering, there is no sorrow in the sixth palace	What the poet chooses is the moment before the conflict between the "beautiful woman" who has not yet entered and the "six palace" concubines and concubines. Again, this particular moment includes pre-pregnancy and post-conception. It contains and implies "many line events" before and after this moment.
Kim Chang-Seo "Spring resentment"	When the yellow yinger is played, do not teach the branch to cry. When I cried, I was shocked and dreamed of a concubine, and I could not get west of Liaoning	The poet appropriately selects the moment when the young woman in her boudoir "plays a warbler and seeks a dream" before going to bed. From this moment, readers can infer that the lyrical protagonist must be separated from her husband who joined the army. There is no news for a long time, and longing and worry coexist. However, a weak girl in her boudoir has no other way to find other than to ask for a dream. The dream is so urgent, so she has a conflict with the "Huang Ying" who may have a startling dream. In order not to be disturbed by such a dream "Fighting warblers." But after "playing the warbler," will you be able to fall asleep and dream? Even if you dream, will you be able to dream of the husband who is in the army? This moment before and after pregnancy can prompt readers to develop rich associations.

"still action" in similar dramas. The dramatic situation of "silence" or "pause" can inspire readers' aesthetic imagination and obtain "greater artistic effect," for example, Li Bai's "The Resentment of the Jade Order": "The jade order produces white dew and the long night invades Luosock. But under the crystal curtain, exquisitely looking at the autumn moon." The whole poem only depicts the two "still movements" of the lyrical protagonists, "Empty Courtyard Long Li" and "Looking at the Moon over the Curtain." There is not a single word of "grievance" in the poem, but the "grievance" of the characters is revealed on the back of the paper. Therefore, such an effect is produced because the poet is good at using "static movements" to construct a dramatic and nurturing poetic environment. The lyrical protagonist who stands silently in the empty courtyard is just like an actor who "pauses" in a performance on the stage. "Pause" is not Stop, it aroused the audience's doubts and expectations and mobilized the enthusiasm of the audience to play their imagination, so the readers' aesthetic imagination unfolded as promised. On the one hand, we are an audience, watching

a performance of a fateful situation in front of our eyes; herself, play her and enter her situation, and feel the resentment of this jade order from her point of view. There are many such works in Tang Dynasty quatrains, such as Zhang Zhongsu's "Spring Girl," Zhu Jiang's "Spring Girl," Han's "Han Gong Song," and Bai Juyi's "The Girl." "Cage" or "stop the needle," or "lean on" or "lean," all of them are like actors who "pause" for a moment on the stage. Although they are silent, they can arouse the readers' corresponding aesthetic emotions, so as to obtain "bigger" artistic effect."

In ancient Chinese opera literature, we can also see such a dramatic situation of "silence." In Wang Shifu's "The Story of the West Chamber," when he heard that the old woman wanted Yingying to be "commensurate with her brother and sister," Zhang Sheng was "tired and paralyzed to make a stack" and just drank it mechanically. The wine that the matchmaker handed over. In this dramatic situation, the conflict between the old lady and Zhang Sheng and others reached a climax, but the playwright arranged a "silent" action for Zhang Sheng. Obviously, the "silence" at this time

implies the character's hope. The complex psychology of the peak falling to the bottom of the disappointment is worth a thousand words and more artistic than a burst of crying and hysteria. Moreover, after Wen Yingying left, Zhang Sheng made a necessary preparation for the questioning of the old lady.

3.2. Dramatic Plots in Tang Dynasty Quatrains. Compared with the concentrated dramatic situation, some Tang Dynasty quatrains show a time process or a certain spatial transformation, which is equivalent to a fragment of a plot. These dramatic plots contain certain dramatic conflicts and sometimes use some dramatic techniques to enhance the drama, and some of these dramatic plots even directly become the material of later dramas. Similarly, the dramatic material in poetry also contains many specific objects in natural environments, such as mountain peaks and clouds, which can constitute the dramatic material.

The fundamental difference between dramatic plots and ordinary story plots is that they can constitute conflict. In the quatrains of the Tang Dynasty, this kind of dramatic conflict is mostly manifested as the inner conflict of the characters, for example, Han's "Occasionally Seen": "To beat the sleepy and untie the skirt, and point to a statue. Seeing guests come and laugh away, rub plums in the middle of the door." A series of actions constitute the plot, and the characters are ready to emerge: "This is exactly what the actions and expressions of a 13- or 14-year-old ancient girl who is not too shy yet, but already knows she should be shy." It was this girl's inner conflict —wanting to see a visitor but being embarrassed to meet a visitor— that constituted the dramatic conflict.

In order to enhance the drama of the plot, this kind of Tang Dynasty quatrains also use some dramatic techniques, such as suspense and sudden turn, as shown in Figure 4. Tan Xusheng said, "Suspense is an important issue related to drama."

The following selected Wang Jian's "Palace Ci" successfully uses the suspense technique. "Palace people clapped their hands and laughed at each other, sweeping the floor before they didn't know the steps. Begging and money arguing for borrowing, and it seems like there is no place outside?" A series of actions of the characters in the poem constitute the plot. The scene at the beginning was suspenseful: a group of court ladies laughed, shouted and clapped their hands, what made them so happy? The second sentence pointed out that the reason for the cheers was actually seeing a new unfamiliar sweeper in front of the palace steps. What is there to be happy about? The suspense at the beginning was not resolved but deepened and then the group of court ladies rushed to give money and sweep the floor, just to ask him something. What are the words so important, worthy of this group of palace maids? The suspense reached its peak. Finally, the suspense is lifted with the character's sentence: "It seems that there is nothing here outside?" While releasing the suspense, the readers also feel their inner distress and sadness behind the cheering of the characters. Because the sweeper had just entered the palace,
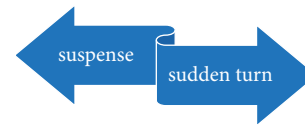
FIGURE 4: Dramatic techniques used in Tang Dynasty quatrains.

he was so happy to be able to ask him about the scene outside the palace. It can be seen how many years they have been in the palace and how many years they have been isolated from inside and outside. The conflict between people and the environment constitutes a tragic plot, and the use of suspense techniques strengthens the tragic plot.

The dramatic plot pieces of some quatrains even provide the plot directly for the play, for example, in Du Mu's "Quanjue Passing Huaqing Palace": "Looking back at Chang'an, there are piles of embroidered embroidery, and thousands of gates on the top of the mountain are opened one after another. When a concubine of Hongchen laughs, no one knows that it is a lychee." "Incoming Fruit" reappeared in the first out. He took advantage of the style of drama and transformed the plot into a series of dramatic scenes and more tortuous storylines: the envoys from Nanhai and Shuzhou rushed all the way to get fresh lychees to the court as soon as possible and were killed. The old man selling divination trampled the peasants' crops. The two are still vying for good horses at the poststation. Another example is Cui Hu's quatrain "Tiducheng Nanzhuang," which was cited by the Ming Dynasty dramatist Meng Chengshun as plot material. In the novel, the peach blossoms on the human face are red with each other. Where will the human face go now? The peach blossoms are still smiling in the spring breeze," so the twists and turns of the plot are full of poetic and picturesque. The same is true of Leng Chaoyang's quatrain "Send the Red Thread," which directly became the material for the work "Red Thread Girl" by Liang Chenyu, a playwright in the Ming Dynasty. The abovementioned drama writers keenly captured the dramatic elements in these widely read Tang quatrains, used them directly as drama materials, and greatly developed the drama in them. The element of peach blossom is used in the ancient poems, and the peach blossom represents the natural environment, so the natural environment influences the literary color of the poetry by influencing the poet's creative inspiration.

4. Dramatic Discourses in Tang Dynasty Quatrains

There are also some Tang Dynasty quatrains that neither express the concentrated situation nor show certain plot fragments. The whole text seems to be the author's endorsement of the characters speaking to a specific object. Narrative discourse is different, but has the characteristics of dramatic discourse.

Most of the lyrics used for music in the Tang Dynasty were excellent five-seven-character quatrains. Tang quatrains, which can sing and can be enjoyed by both the refined and the popular, are close to dramatic discourse in their clear

and subtle features. In some lyrical Tang Dynasty quatrains, the poet puts himself in the shoes of the characters he endorses and the characters' language is full of personality, which is similar to the personality of the language of the characters in the drama of the endorsement style. The drama wheel of the Tang Dynasty is shown in Figure 5. The main reason why these Tang Dynasty quatrains can be regarded as dramatic discourses is that the objects of the characters' dialogues or monologues are specific objects determined by the characters themselves in a specific situation and belong to the readers and listeners in the works, not outside the works. This is the biggest difference between dramatic discourse, lyrical discourse, and narrative discourse, the latter two being aimed at readers and listeners outside the works. At the same time, these discourses are all words that characters must say in a specific time, place, and environment, for their own purposes, to take action to a specific object, so they have a certain action.

First of all, the clear and implicit language features of these Tang quatrains are similar to the dramatic discourse.

Such excellent Tang Dynasty quatrains are often sung with music, so that all the listeners can understand them, so the language should be clear and clean, but also to make the listeners emotional, the content should be profound and tortuous. Therefore, it corresponds to the clear and implicit characteristics of dramatic discourse, for example, Shen Xun's "Feast of Poems": "Don't hit the wild goose from the south, fly from him to the north. When you hit a double hit, don't send the two to separate." The lyrical protagonist is pitiful and sympathetic, and the complex mentality of empathy is also understood by the listeners.

Second, the characters in this kind of Tang Dynasty quatrains have distinct personalities, similar to the characteristics of dramatic discourse.

In addition to being clear and subtle, dramatic discourse must also be able to express the personality of the characters, as Li Yu, a drama theorist in the Qing Dynasty, said, "Make sure your heart is subtle and spit out casually. Make it superficial." That is to say, the characters' language must be able to show the little-known and difficult-to-understand secrets in the characters' hearts, and this display must be "spit out," that is, naturally and clearly. It is also necessary to "say one person, and Xiao one person," that is, the words are like the person and the character's character can be seen from the language of the character. In the quatrains of the Tang Dynasty, we can see some lyrical quatrains, imitating the tone of the characters they represent. Even the same women have different personalities. Table 3 lists the distinctive characters in the four lines of the Tang Dynasty.

Third, the lyrical protagonists in this kind of Tang Dynasty quatrains have definite speaking objects in the works.

Both characters speak by themselves, and the lyrical discourse is aimed at readers or listeners outside the system of the work, while the lyrical protagonists of this type of Tang Dynasty quatrains speak from the internal system of the work, so they are not lyrical discourse and have the characteristics of dramatic discourse. For example, in Shen Xun's "Feasting Poems," the lyrical protagonist speaks to the man in front of the wild goose who he (she) wants to dissuade. The outspoken swordsman in Jia Dao's "The Swordsman" speaks to his confidant who is worthy of a sword. The lyrical protagonists in Li Bai's "Ba Nuci," Meng Jiao's "Ancient Resentment," and Zhang Jiuling's "From Your Majesty Has Come" are all their "Langjun," the difference is only that some are in front of you and some are not in front of you.

Finally, the discourse of this kind of Tang Dynasty quatrain also has the characteristics of action similar to the dramatic discourse.

Most of the words spoken by the lyrical protagonist of this kind of Tang quatrains are what he or she must say at a specific time, place, and environment, for his or her own purpose, to take action against a specific object. Therefore, it has the characteristics similar to the action of dramatic discourse. Typical examples in this regard are the first two poems of Cui Hao's "Changgan Song," the two poems are like questions and answers for children on the river. First, the woman asked, "Where does Jun's house live?" Without waiting for the other party's answer, she said, "The concubine lives in Hengtang." It's a fellow countryman." In a series of words, the image of a girl who is both enthusiastic and measured, both hearty and reserved, suddenly appeared on the paper. Behind the simple language of the characters, we can imagine a series of actions of the characters: the girl fell in love with the young man among the countless boats that came and went and tried her best to make her boat catch up with the young man's boat. The second song is the answer for the young man: "My home is near the water of Jiujiang River, and I come and go to the side of Jiujiang River. We are both from Changgan, but we didn't know each other when we were young." Behind the simple language of the character, we can feel his inner actions: the joy of meeting the villagers and a trace of regret for seeing each other late. This is also the emotional reaction that the girl's words caused in his heart. The dialogue between the two characters seems simple, but they are actually full of action and subtext. The characters are divinely shaped, and even the atmosphere of the scene is in front of us, as if the poet used forty words to show" us a love drama, just as Zhu Guangqian said, "It's like a scene . . . . The moment taken from the life and life of the artist . . . . This is a moment, art infuses it with life, and it becomes eternal . . . ."

To sum up, compared with the drama in the drama literature, due to the influence of the natural geographical environment, the plot of the four lines in the Tang Dynasty is not complicated, often just fragments, the conflict is not fierce, the relationship between the characters is not complicated, and the movements of the characters are very simple. However, it has been recited by the population for a long time. It can sing and be appreciated by both the refined and the popular. It is loved by all social classes and has many similarities with ancient Chinese opera. It goes without saying that Chinese drama literature draws nourishment from Chinese poetry in many ways, but the dramatic factor in the quatrains of the Tang Dynasty, which has been recited by the population for thousands of years and has a wide and lasting power of dissemination, should be one of the most influential factors in Chinese drama literature. It is an aspect
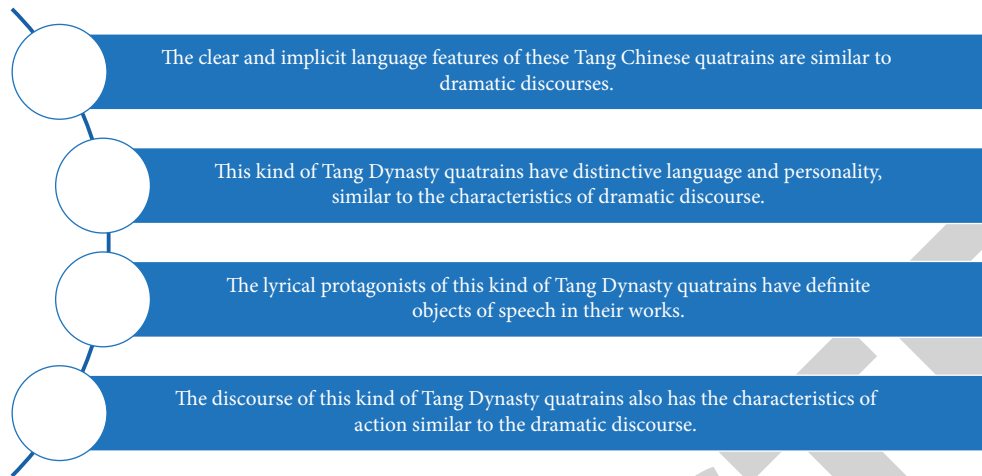
FIGURE 5: Dramatic discourses in Tang Dynasty quatrains.

TABLE 3: Characters with distinct personalities in Tang Dynasty quatrains.

Chao Cai "Midnight song"	"Nong has cut the cloud, and Lang has also divided his hair. Looking for no one, wan makes a concentric knot" "Jade fingers on the bright window, nails are like crystal. Cut Tejiro, talk and go hand in hand"	What we see is a happy girl who is in love
Li Yi "Jiangnan song"	"Marry Qutang Jia, and the court missed the concubine period. If I knew that the tide has faith, marry and follow the tide"	We clearly saw a businesswoman in her boudoir who was extremely resentful

that cannot be ignored and thus gets due attention and research.

5. Conclusion

This paper studies the cultural characteristics of different historical background and the specific influence of natural geographical environment on the traditional culture, explores the drama factors in the four lines in the Tang Dynasty, and determines the dramatic elements in the Tang Dynasty poetry. The geographical study of ancient Chinese poetry drama factors has certain significance.

In a word, poetry and literature, as an important human spiritual activity content and the way of life existence, will undoubtedly be affected by the geographical environment. Therefore, when studying literary works, we should not only pay attention to the author's life experience and time background but also pay attention to the influence of geographical environment in the process of literary work creation, which is more conducive to our comprehensive understanding and appreciation of literary works.

Data Availability

The labeled dataset used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Retraction

Retracted: Research on the Integrated Development of Local Art Design and Art Design Education in the New Media Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] Z. Wang and B. Liu, "Research on the Integrated Development of Local Art Design and Art Design Education in the New Media Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 1105679, 10 pages, 2022.

Hindawi

Research Article

Research on the Integrated Development of Local Art Design and Art Design Education in the New Media Environment

Zhuo Wang [1] **and Bo Liu** [2]

^{1}*H.S. Skovoroda Kharkiv National Pedagogical University Changchun College of Electronic Technology, ChangChun 130000, China*
^{2}*ZhuHai City Polytechnic, Zhuhai 519000, China*

Correspondence should be addressed to Zhuo Wang; daiz@ccu.edu.cn

With the rapid development of the times, various industries have undergone earth-shaking changes in the face of development trends. The education industry is also making progress in development. Art design and new media technology can be better presented to the public, and it is also convenient for designers. This paper investigates the local art design and art design education. (1) The new media art design and the traditional art design are compared, and the advantages and disadvantages are analyzed. Both have advantages and disadvantages, and they should learn from each other and improve the disadvantages. (2) Conducted an investigation and analysis on art and design education, and the analysis results showed the defects of today's art and design education, and analyzed the methods of improving art and design education through the school's investigation and applied it to art and design education. (3) Artists and designers are very important for local art. This paper analyzes the genealogical relationship of art designers and the composition of local art designers, taking Yunnan as an example.

1. Introduction

Zen is the product of the combination of Chinese culture and Buddhism, and it permeates our lives. It endows the traditional art design with special color, which affects our sense of design unconsciously, but is rarely noticed. In this article, when people understand the importance of tradition, the influence on Chinese art and design is explained from three important points [1]. This article describes that with the development of computer graphics, the method of art design has changed, and it has gradually shifted to information-based 3D modeling. This technology enhances the beauty and expressiveness of art, and individual aspects also have different design performance [2]. The development of the design industry depends on the cultivation of creative talents, which will determine the development progress of China's future creative design industry. It is a new challenge to art and design education. This paper reflects on the current situation of art education in our country [3]. Color

design is particularly important in product innovation design, and the focus of enterprise product development lies in how to design the best color scheme. With the progress of society, many industries have done a lot of research on color and carried out design work. This paper focuses on the modern art design of color research [4]. Art design is the fusion carrier of technology and art, and design plays a decisive role in art appreciation. Artistic conception is the soul of artistic design and the language of the author. The lack of artistic conception will make the emotional expression of the design product relatively blank, and the ideal life and emotional devotion will enhance the artistry of the work [5]. This article introduces the concept of creative thinking and explores the various characteristics of artistic design. We found the huge impact of creative thinking on the work, thus summarizing the ways to improve creative thinking [6]. This paper analyzes the current situation of art design, puts forward the connotation of design, finds the most suitable art design method, and finds the most suitable

teaching mode for art design elites in society [7]. With the rapid development of the 21st century, art and design stand out, and art and design education is more important. We have only recently started to carry out art and design education, and it is developing at full speed. We are also willing to accept challenges and reform education issues [8]. The works based on the combination of practicality, aesthetics, and material are environmental art design. We analyze the art design works from semiotics, which promotes the development of semiotics. The synthesis of art design also reflects the improvement of society at the material and spiritual levels, including humanistic characteristics, the value of the times, the development of productive forces, and other aspects. "Symbol" belongs to the category of "environmental art" and has the function of "signans and designatum." As the carrier of social economy, culture, and spiritual emotion, symbols express human value and aesthetic connotation in form. Therefore, environmental art design is the combination of material value and spiritual value [9]. With the rapid development of society and the adaptation of cultural development, people's behavior and artistic design have been greatly affected, which is inevitable, and also reflects the diverse society Therefore, in daily art design, seeking cultural significance, caring about social development, and improving the perception of art design are the basic requirements of art design, and it is also the embodiment of the essential quality of modern social citizens [10]. The social reality of high-standard competition requires more comprehensive development of art and design talents. Promoting quality education is an important task for art education to cultivate more qualified creative talents. Considering design education from a long-term perspective, humanities should be the primary task. As the core part of education, scientific and feasible arts should be constructed. Design education system and its adaptable talent training mechanism [11]. We take the five senses as the basis, and use the art design often used in life as a case, such as advertising design, landscape design, book design, etc., The five senses are vision, hearing, in-depth analysis of smell, taste, and touch. Any one of the basic senses or the combination of any two senses can produce greater impact on artistic design, guide the mind, and perfectly realize the purpose of "design is to serve the people" [12]. Protecting minors from harmful content in a converged media environment has been a regulatory concern for quite some time. The risk of children accidentally discovering potentially harmful material is proportional to the speed at which technology evolves, such as Internet broadband availability of access [13]. New media is developing rapidly, is a new form of communication, and it only took ten years to compare with traditional media. Traditional media (newspapers, radio, TV, etc.,) costed dozens of years or even hundreds of years, and it has developed at an astonishing speed. Now, new media has become the main medium for contemporary Chinese college students to perceive the world and has had a broad and far-reaching impact on college students' thinking. Facing this new situation, in education work, the readers should grasp the context of the times, actively meet the opportunities brought by the times, emancipate their minds, and strive to

explore new ways and new methods to carry out ideological and political work in the new media environment, so as to improve the effectiveness of ideological and political education [14]. In reviewing the literature discussing the basic premises of agenda setting theory and empirical research, a "new frontier" in the relationship between traditional elite media and new media is proposed. The aim is to explore the extent to which the dynamics of information flow created in new media distort this theoretical perspective. Traditionally assumed bounds [15].

2. Media Modern Art

2.1. Digital Media Art Design. New media art design is also a design based on digital media. At the same time, it uses visual art, computer graphics, media science, and many other disciplines. New media art design is expressed through graphics, images, and other media-based information. The development of digital media art design has brought a new direction to modern design, and it has been widely used in modern design to meet the needs of the times with its dynamic expression characteristics. We hope to simplify the design process and enable the design of rich representations and vectors. Digital media art design can transform traditional design methods into digitization. Through digital technology, the traditional art can be designed in three-dimensional form. Make traditional art have a more vivid form of expression and display the works through digital images and digital short films. By integrating traditional art into the works, the cultural connotation of digital media art design is enriched, so that traditional art can be protected and promoted by using digital media art design as a carrier.

2.2. Classification of Modern Art Design Styles. Art Nouveau design before the Industrial Revolution was a reactionary phenomenon before art design became a discipline, as the neo-bourgeoisie of the time wanted to show differences with nobility, royalty and class owners in all respects, not just age groups. In Greece, the revival of the political situation of the times, the history of design calls for the formation of neoclassicism. Theatrical development was influenced by neoclassicism, as a cultural activity, forming a background that focused on the classical, the sophistication and rigor of neoclassicism was to return to the architecture of the purely Roman era, and the combination of art and technology was the result from the nineteenth century. In later styles, historical regression and neoclassicism began to change, the development of modern industry requires the combination of art and technology, the process of transition to modernity, the "Arts and Crafts" movement, the "Art Nouveau," and the "Art Nouveau" movement in this process appeared, all in response to the industrial style, emphasizing that inspiration and design motivation come from nature. A natural drama is formed here. The shape of the space is picturesque and realistic. The exterior scenery is created, the stone tree is used to create the scenery, and the interior scenery is picturesque, and a series of posters, tickets, sets, and costumes for the theatre were designed. The Art Deco style movement does

not hate the new era of mechanical crafting as much as Art. Art Deco is not only based on the characteristics of manufacturing, but also retains the luxurious craftsmanship, so that the shape of the stage space also presents a delicate, bright, and exaggerated transformation. Radial colors and patterns of sunlight, shapes of fountains, and the use of metallic materials were common elements of that time. Hollywood style is the development of Art Deco to the extreme. The business theme focuses on luxury living in a high society. After the two World Wars, modernism gradually became the dominant style of world design. Cumbersome classic patterns are not allowed to get in the way of the manufacturing process. After the war, countries sought a quick recovery. It is in such a social environment and context that modernist drama unfolds. It happened and rebuilt a lot of theaters. Unsettled societies and brutal wars have given rise to various philosophical and cultural trends. In the theatre world, people reflect their repressed feelings when they write scripts. At the same time, they use the development of science and technology to modernize the landscape. Space and style continue to enrich the expressiveness of the scene. The form of the space pays more attention to expressing semantics rather than pursuing the complex decoration of the past, supplementing symbols and metaphors with visual means, and not sticking to imitation. The postmodern style came about because the system established by modernity has been mainstream for a long time and can only breed boredom. After World War II, postmodern literature and theatre emerged and separated from it. Life breaks the illusion of drama and attaches importance to audience participation in the creation of drama art, which is more stylistic and symbolic.

2.3. Comprehensive Art Design. As science becomes more and more different, art design will become more and more international. Separation and integration between disciplines infer a continuum of new disciplines and vocabulary, such as topics covered, interdisciplinary subjects, range subjects, and cross-sectional subjects. Trends in interdisciplinary integration has had a huge impact on the field of art and design. In contemporary art design, in addition to comprehensive drama specializing in printed film art, landscaping, urban design, landscape, industrial product design, etc., the design phenomena covered in social contexts are more diverse, such as global exhibitions and other global/national sports events. Exhibits and exhibitions cover large series. The "impressions" of the performances covering historical sites, festivals, fashion shows, and theme parks represented by Disneyland all present diverse and complex themes. There are various artistic forms and complete artistic expressions. The vigorous development and excellent practice of unified art and design innovation have promoted the rapid development of the art and design field. The knowledge about art and design is interrelated with other disciplines, which makes it more exploratory and avant-garde, and the inclusiveness of art and design is also vividly reflected, such as cross-border design. Cross-border design, incremental design, system or overall design each have

different focuses and connotations. It includes different understandings, perspectives, and organizational methods of "design," which on the one hand reflects the influence of multiple or similar disciplines on the design discipline, and on the other hand, reflects the design discipline's requirements for its own development. Areas of study actively combine new directions and design styles with adjacent and other disciplines However, due to the specificity of the field of art and design, the scope, type, direction, and definition of these general design categories are not clear enough, therefore, in many cases, many design names are easily confused or replaced. Others, therefore, are better understood and remembered for many types of integrative artistic designs on the basis of disciplinary-level induction, analysis, and comparison.

3. Art Design Algorithms

3.1. Art Design of Genetic Algorithm. Let the number of elements of the designed character be N, the fitness of the N elements is f_i, and the probability of the i-th element being selected is:

$$P = \frac{f_i}{\sum_{i=1}^{N} f_i}, \quad i = 1, 2, \ldots, N. \tag{1}$$

The dynamic construction process of characters is an important part of art design, and the positions of elements that make up characters are also changing all the time. We set the position changes of characters from the initial time to the final time within a certain period of time as the choice of crossover in the $\delta(H)$ algorithm. We set the probability of change as P_c and P_m, so that the expected value of the dynamic movement of the next generation of characters is:

$$E[m(H, t+1)] \geq m(H, t) \cdot \frac{f(H, t)}{\overline{f}(t)} \cdot \left[1 - P \frac{\delta(H)}{L-1} - O(H)P_m\right]. \tag{2}$$

We choose the concept of cross operation when calculating this data. There are many elements required in character design. In order to avoid inconsistencies, precise calculation and measurement are required. Cross operation can reduce the possibility of errors with a high probability.

In the formula, $O(H)$ is the dynamic movement level of the character; L is the farthest distance of the character movement; $m(H, t)$ is the number of elements that the next generation needs for the dynamic movement of the character; $f(H, t)$ and $\overline{f}(t)$ are the fitness and average adaptation of the elements that the next generation needs for the character movement.

According to the element selection requirements for dynamic changes of characters, in order to ensure the integrity of the changes in the original design of character elements during the construction of the genetic algorithm and to avoid local inconsistencies in the design changes of artistic characters, the concept of selection of crossover operations must meet the following requirements:

$$P_s \geq 1 - P_c \frac{\delta(H)}{L-1}. \tag{3}$$

According to formulas (2) and (3), we can get:

$$E[m(H, t+1)] \geq m(H, t) \cdot \frac{f(H, t)}{\overline{f}(t)} - P_c \frac{\delta(H)}{L-1}, \tag{4}$$

$$E[m(H, t+1)] \geq m(H, t) \cdot \frac{f(H, t)}{\overline{f}(t)} \\ \cdot \left[1 - P_c \frac{\delta(H)}{L-1}\right] (1 - P_m)^{o(H)}. \tag{5}$$

In formula (5), if the value of P_m is generally small, it can be further optimized to obtain:

$$(1 - P_m)^{O(H)} \approx 1 - O(H) \cdot P_m,$$

$$\left(1 - P_c \frac{\delta(H)}{L-1}\right)(1 - O(H) \cdot P_m) \geq 1 - P_c \frac{\delta(H)}{L-1} - O(H) \cdot P_m,$$

$$\text{if } \frac{f(H, t)}{\overline{f}(t)} > C (C \text{ is a constant}). \tag{6}$$

It means that the operation has not reached the optimal solution calculated by the algorithm, let:

$$K = C \cdot \left[1 - P_c \frac{\delta(H)}{L-1} - O(H) \cdot P_m\right]. \tag{7}$$

If $K > 1$, then there are:

$$E[m(H, t+1)] \geq m(H, t) \cdot K. \tag{8}$$

From this, it can be deduced that:

$$E[m(H, t+1)] \geq m(H, O) \cdot K. \tag{9}$$

After the genetic algorithm iteratively selects and calculates the dynamically changing elements of the character, the position change of the character element of the artistic design can be realized within a certain period of time. In the process of position change training, the particle swarm algorithm has unique advantages. After selecting the character elements of artistic design according to suitability through genetic algorithm, the optimization of particle swarm is applied to the art design process to better complement the dynamic style performance of the characters.

Particle swarm optimization (PSO), also known as particle swarm algorithm, is an evolutionary computing technology developed by J. Kennedy and R. C. Eberhart in 1995, derived from the simulation of a simplified social model. In this paper, the particle swarm algorithm optimization can better capture the motion attitude and the dynamic style during design.

3.2. Art-Aided Design Methods. When in a very complex scene image, it is very likely that the information we want to collect is blocked by objects, the color changes, and the shape and size are different, which is not conducive to collecting the required information and features. Therefore, in the art-aided design process based on the visual scene understanding algorithm, we determine the threshold and number the colors in the scene image, process the effective area through morphology to obtain the candidates we need, and then use the SIFT. The abbreviation of SIFT is scale invariant feature transform, which was proposed by a Canadian professor, David G. Lowe. The SIFT feature remains invariant to rotation, scale scaling, brightness changes, etc., and is a very stable local feature. Features: (1) the local features of the image remain unchanged for rotation, scaling, and brightness changes, and also maintain a certain degree of stability for viewing angle changes, affine transformations, and noise. (2) Good uniqueness, rich in information, suitable for fast and accurate matching of massive feature libraries. (3) Abundant, even a few objects can generate a large number of SIFT features (4) High speed, the optimized SIFT matching algorithm can even achieve real-time performance joint. In this paper, the new media art design uses the SIFT feature to extract the feature of the target object, that is, the feature 1 can be used to extract the local features of the image more stably. Feature extract the target features of the candidate area, input the complex design system, and verify the certification result in the art-aided design.

Color segmentation of a known scene image based on specified thresholds in one or more color spaces, typically RGB, HIS, HSV, and LCH. The specific formula of the scene image segmentation algorithm is:

$$(x, y) = f_1(x, y) \& f_2(x, y). \tag{10}$$

In the formula, x, y represents the horizontal and vertical coordinates of the plane, respectively, where the image is located. $f_1(x, y)$ has different values under different thresholds. When the R channel of the input image is less than the optimal threshold in the RGB color space, color threshold can be ordered to convert a grayscale or color image to a high-contrast black and white image. Example: specify a certain level as the threshold, all pixels brighter than the threshold are converted to white; all pixels darker than the threshold are converted to black. The threshold command is useful for determining the lightest and darkest areas of an image. $f_1(x, y) = 255$, otherwise $f_1(x, y) = 0$, $f_1(x, y)$ can effectively eliminate the interference of the blue area in the image, especially, it is in the outdoor scene image, which obviously controls the interference effect caused by the sky to the blue area. However, $f_1(x, y)$ has no effect on the interference of dark areas such as black, gray, and brown. Therefore, $f_2(x, y)$ is introduced into the formula to solve the problem. $f_2(x, y)$ can eliminate interference such as green, red, orange, etc., which are very different from blue.

In the HSV color space, the value of $f_2(x, y)$ is also 255 if the H channel of the input image is within the upper and lower optimal thresholds. However, since images input to the software are usually in the RGB color space, conversion

between the two-color spaces is required. The conversion formula for H is:

$$H = 0 \max = \min,$$

$$H = 60 \times \frac{G - B}{\max - \min}, \max = R\&G \geq B,$$

$$H = 60 \times \frac{G - B}{\max - \min} + 360, \max = R\&G < B, \quad (11)$$

$$H = 60 \times \frac{G - B}{\max - \min} + 120, \max = G,$$

$$H = 60 \times \frac{G - B}{\max - \min} + 240, \max = B.$$

The maximum and minimum values represented by max and min are relative to the pixels in the RGB space. When max = 0, the S channel is also 0, otherwise it is the difference between 1 and the maximum and minimum values. When the segmentation is completed, the segmented image will be disturbed by a lot of external factors, resulting in a lot of noise and breaks, so we need to it is processed to reduce the influence of noise, and morphological processing is used in processing, and connected regions can also be obtained.

Assuming that A and B are sets in the two-dimensional space z^2, use the expansion operation to re-split the broken part of the candidate area, fill the broken contour, define all Z displacement sets as B expand A, and ensure that at least one element in A and B overlaps, followed by an etching operation, smoothing the contour of the area, breaking up narrow gaps and burrs. There are still unremoved interference areas in the image after morphological processing. In order to reduce the influence of interference areas, it is necessary to formulate rules to extract candidate scene areas. Set the connected region as C_i ($i = 1, 2, \ldots, n$), where i represents the ith connected region and n is the number of connected regions. The width, height, and area of the connected region are denoted as L_i, W_i, and S_i, respectively. If all three meet the following conditions:

$$S_i \geq S_{\min} \cap S_i \leq S_{\max},$$

$$\frac{L_i}{W_i} \geq \left(\frac{L}{W}\right)_{\min} \cap \frac{L_i}{W_i} \leq \left(\frac{L}{W}\right)_{\max}, \quad (12)$$

$$\frac{S_i}{L_i \times W_i} \geq \left(\frac{S}{L \times W}\right)_{\min}.$$

It can represent the connected region as the candidate region we need. In the formula, $S_{\min}$ and $S_{\max}$ represent the min value and max value of the area of the connected area; $(L/W)_{\max}$ and $(L/W)_{\min}$ represent the maximum and minimum value of the aspect ratio of the connected area; $(S/(L \times W))_{\min}$ represents the minimum value of the duty cycle. Shape features classify images.

4. Investigation and Research on Local Art Design and Art Design Teaching

4.1. Survey of Local Art Designers. The development of contemporary art lies in the ideas and candidates of local art creators. We have published a questionnaire for local art creators in Yunnan to consult. The content of the questionnaire is related to the biography of the artist, factors affecting personal creativity existing situations and problems in understanding contemporary art There are 45 questions in total, and the questionnaire data was collected through written comments or interviews and face-to-face questions. After statistical analysis of the content of the questionnaire, combined with various data from historical surveys, we can basically see that the genealogy of contemporary Yunnan artists can be organized, which is composed of complex relationships between individual artists and groups. In the relationship between artist groups and time and social development, we will first analyze the genealogy of local artists and study their changing laws to better understand the genealogy changes. It is shown in Figures 1 and 2.

In Figure 2, in the text, the age distribution of local artists in Yunnan is introduced. Local art designers are mainly divided into two categories: full-time art designers and part-time art designers. The image depicts the age distribution of the two, which is in sharp contrast. You can see that among the part-time art designers, the most employees are 20–30 years old, and the most full-time art designers are 30–40 years old. The art designers and practitioners are basically distributed in all age groups.

According to statistics, about 77% of contemporary artists in Yunnan are mainly engaged in artistic creation and production. And are a full-time artist; in addition, they work in the field of art education and pursue this direction. Creative artists account for about 23% of the total. Since 2000, most artists in Yunnan have recognized and accepted various concepts and expressions of contemporary art and have begun to try to clarify their creative direction. The creations and influences of Mao Xuhui, Zhang Xiaogang, Ye Yongqing, Zeng Xiaofeng, Tang Zhigang, He Yunchang, and others in the Yunnan art world have been generally unanimously affirmed, and they are very much in favor of promoting the history of the creative library art world.

According to Figure3, we can know the professional identities of art designers in various periods. As the emphasis on art design has gradually shifted from amateur artists to professional artists, art design works have become more and more popular and can be used by more people. Understanding has gradually changed into art design dominated by market economy.

Most of the artists in this artist's pedigree are from Yunnan Art Institute. Some are former students, some are university teachers, and some young artists are from Yunnan University Art College, and about 29% of them are artists from other backgrounds. It has to be said that the artists born in the 50s and 60s had a direct or indirect influence on
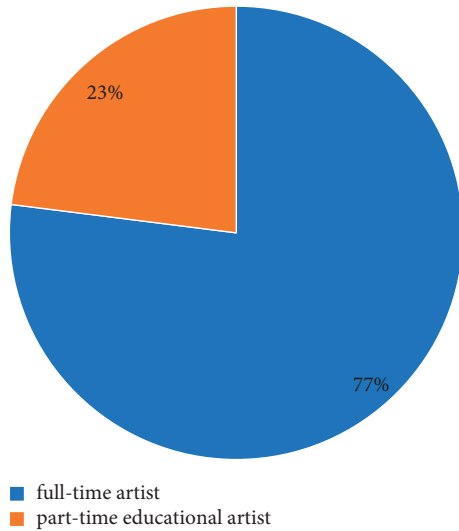
FIGURE 1: Appointment of Yunnan artists.
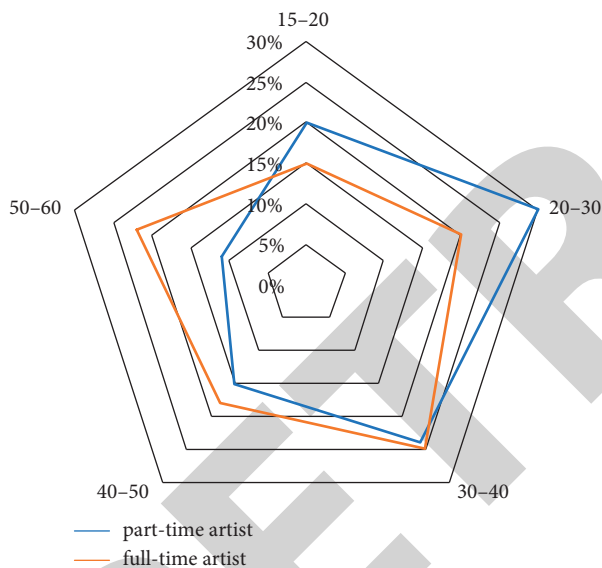
FIGURE 2: Artist age distribution.

the young artists born in the 70s and 80s. Much of the focus is on easel painting and more on young artists. Tendency to experiment, change and use different media to seek new experiences and advancements in all forms of media, there is no fixed system of its own. It is shown in Figures 4 and 3.

4.2. Advancement of Early Art and Design Education Courses. After the serious failure in the Sino-Japanese War, the Qing government finally realized the real gap between its own strength and that of the West. See the success stories of the Meiji Restoration. On January 13, 1904, Zhang Baixi, Rong Qing, and Zhang Zhidong jointly signed the school's revised constitution. Historically known as the "School Regulations," also known as Guangxu (the twenty-ninth year of the lunar calendar) "Gui Mao Academic System," it is the first

comprehensive modern educational system officially implemented in my country. It was implemented nationwide by royal decree. In the primary school rules and regulations stipulated by this school system, painting and handicraft classes in primary and secondary schools are not required to be taught. However, painting and drawing can be done in high school according to the situation in different places. It has become a compulsory course, and the handicraft class continues to teach the content. In the school regulations, the painting class is a compulsory course, and the handicraft class did not appear in the school regulations, but it did not appear until the first year of Xuantong in ancient and modern times (1909), to protect the country and to protect the people. The first is to "deeply cultivate liberal arts, and use the power of consolidating blessings," and divide junior high schools into two categories: liberal arts and practical liberal arts. Then, add the manual lessons to the practice lessons. Because painting and handicraft classes were incorporated into our country's first modern education system, this marks the establishment of the status of these two courses in the general education cycle. In the "Gui Mao School System," the educational requirements for the painting and crafts departments are also clarified. These craft classes provide a foundation for art and design studies. It is shown Table 1.

It can be seen that the teaching requirements of visual courses are gradual. In elementary school and in some upper grades, only simple comprehension and comprehension forms are required. At the age of four, he began to study. "Geometric drawing," was not taught until middle school. Drawing with tools allows students to practice some drawing skills. "Mechanical Drawing," lays the foundation for later industrial training. At that time, "container painting" was a course that taught students to draw geometric figures. Projection drawings and decorative designs composed of various geometric shapes. It is similar to the mechanical drawings we teach in industrial design. This is first form of modern design teaching in our country.

4.3. The Difference between New Media Art and Traditional Design Art. As the name suggests, the main difference between digital art design and traditional art design is the creation tools. At the beginning of the century, when human life completely relied on digitalization, there were fewer products completely reliant on manual production, while CNC production increased significantly. In addition to product categories, more and more products needed to be designed. There is a circular relationship between learning and the application of people's knowledge, intelligence, and digital skills. A simple studio that used to be able to design and create on a drawing board with a pen and personal creativity will still have to deal with expensive investments in software upgrades, hardware updates, and ever-increasing equipment in the future. Since the production method determines the productivity, we can say that in the information society, the design that turns a "pen" into a "mouse" is called "new media design" or "digital art design." The designer no longer represents a unified identity in the
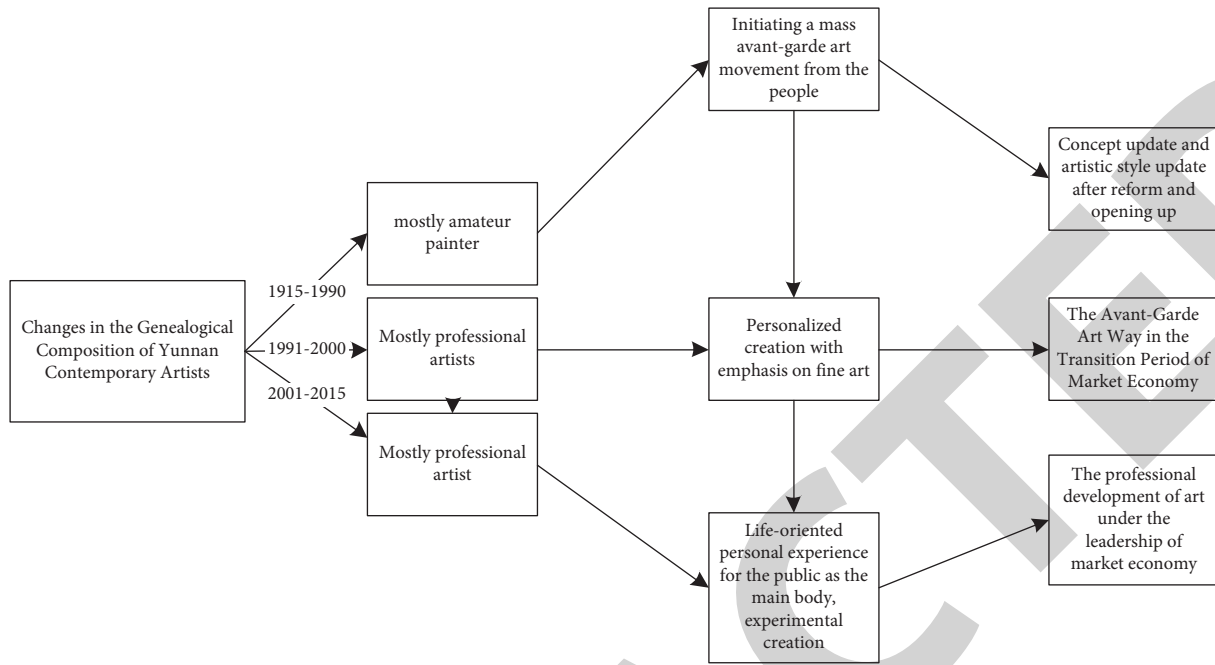
FIGURE 3: The genealogy of Yunnan art designers.
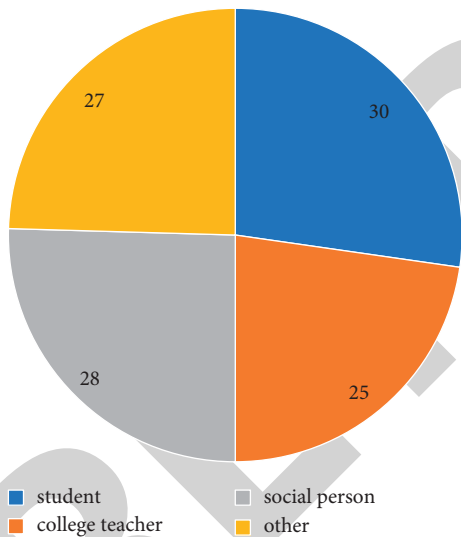
FIGURE 4: The distribution of social status of art pedigree people.

traditional sense. Due to the intervention of digital media, he must assume multiple roles, and the creative process will also support each other through the use and development of computer software and hardware. Designers and even artists are no longer just being creating on drawing boards, but more creative talents, typing on keyboards, and moving the mouse. Moreover, the advantages of digital media lie mainly in early design and creativity. The traditional two-dimensional and three-dimensional rendering information is extended to the four-dimensional space, making people immersive, providing a strong visual experience, and helping to understand the rough details of the designer's design work modification. Also, using high technology can improve the

quality of the design. With the increased speed of post-production, the advent of digital imaging principles, and the systemization of several services such as computer circuit board manufacturing and printing based on this principle, designers have become more efficient and confident overall. The implementation of the design scheme can achieve accurate repeatability, which of course creates favorable conditions for subsequent mass production. With the continuous development of digital technology and the accumulation of a large amount of complex and diverse information, lifelong learning has become a growing experience for future interdisciplinary digital art designers and requires extensive knowledge to process the information itself. Only on this path can we understand and synthesize information from different fields to master higher knowledge. The emergence of emerging media has transformed the entire environment, rapidly changing the way humans live and communicate. Learn traditional languages and grammar replacement procedures. People's daily life, from the alarm clock for getting up in the morning, the microwave for preparing breakfast, and the elevator for going up and down the stairs, car, and plane, all require electronic and digital instrument control systems. Washing machines, audio-visual equipment, rice cookers, central air conditioners, computers and their peripheral equipment, etc., people rely heavily on digital technology in all aspects of clothing, food, housing, and transportation. This kind of influence has changed the aspects of art and design and even education, and it has also caused the development of art and design in the world to show a trend of sometimes becoming popular and sometimes declining. Due to the needs of the industry, the methods of learning are constantly updated, and the traditional teaching burden has increased. Over the years, there has been a tendency to neglect basic skills training.

TABLE 1: Educational essentials of painting and handcraft courses in primary and secondary schools in the late Qing dynasty.

Subject	Elementary school	Higher school	Middle school
Picture	The main point is to practice the hand and eye, develop the mind to see things, and remember the disposition of the real image	The main point is to make the observation of the physical form of the present	The point is to focus on the initial foundation of various industries
Manual	The point is to practice hands and eyes, make simple items, and develop the habit of hard work	The point is to be able to make simple items and develop the habit of mind, patience and hard work	

Whether it is a relatively loose requirement for traditional drawing, painting, learning sculpting techniques, or layered basics like design sketching, most students lack solidity. In contrast, application-oriented design categories, especially degree courses in new media art and design, are increasingly sought after. This makes art and design develop more rapidly, and we also conducted a questionnaire survey on the difference between new media and traditional media among art designers. The survey results are as follows.

According to Figure 5, we can know that the differences between the two are mainly concentrated in the profit model between the two, accounting for 30%; the difference in writing mode accounts for 25%; the difference in key points accounts for 10%; 15% is the difference in the creative process; 20% is the difference in the creative process. Table 2 below compares the advantages and disadvantages of the two.

4.4. Problems in Art and Design Education.

With the continuous development of modern social economy and the development of science and technology, education plays an increasingly important role in the development of human resources. But with the deepening of reform, our education is also deepening. It is these changes that have plagued art and design education. It manifests itself in two main ways. First, the current educational situation is chaotic. Because our country's traditional education system has a history of several decades, reform is imperative. Our country's national conditions are different, and education reform is very difficult. As one of the fringe fields, art and design still stand out. Art design is a multidisciplinary field that combines art, aesthetic thinking, and creative thinking with modern science, technology, environment, and materials. It is closely related to production and people's life and has a unique taste and a strong sense of reality of the times. With the continuous development of Our country's economy, since the late 1980s, the society's demand for art design has gradually increased, and art design has become a popular "making money" profession. Art and design majors are offered in almost all higher education institutions (major or non-major), from small towns and capital cities to counties and cities, and from universities to high schools. In such an era, the teachings of art and design created by the market economy must have many congenital defects. The first is the professional environment, the educational structure, and even the namesake. Some schools do not run schools according to their own conditions, development goals and school management characteristics, and use old schools as reference materials, and the results are uneven. Second, the school itself does not invest enough in art and
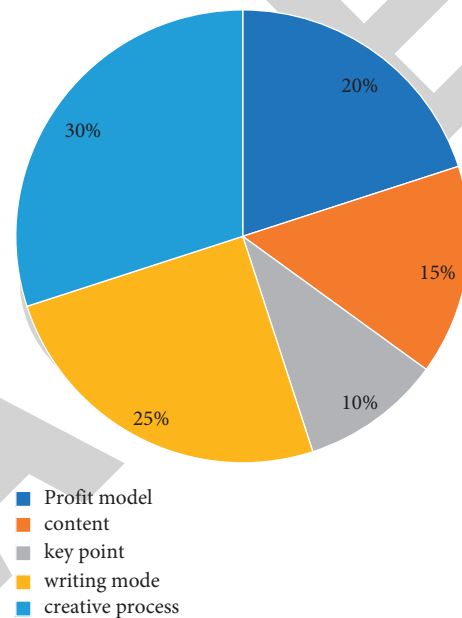
FIGURE 5: Differences between traditional design and new media design.

Legend:
- Profit model
- content
- key point
- writing mode
- creative process

design education. The difference between teaching art design and teaching art is that design has to be beautiful and functional. One of its characteristics is the combination of art and modern science and technology. The last area of application, aesthetics, has a more streamlined appearance, with a significant increase in the participation of technologies such as 3D construction, display design, architectural models, packaging, printing technology, and industrial design. This course requires compatible hardware equipment and on-site support. However, some schools focus only on software design and ignore the hardware design. For art and design education to develop normally, both must develop at the same time. Otherwise, there will be deviations. We randomly selected 50 students from specific educational institutions to investigate the causes of inadequate art and design education in schools. The result is shown in Figure 6 below.

According to the survey, the main reason for the defects of art and design education in schools is that the level of art and design in the school is not enough. For our country, the public attaches more importance to the level of education than to art and design, which leads to a higher distribution of funds and manpower in the school. Most of it lies in cultural learning, but new media art design also requires a lot of resources, so the learning effect is average; other factors including teachers, lack of hardware facilities, and local

TABLE 2: Comparison of advantages and disadvantages of traditional design and new media design.

	Advantage	Shortcoming
Traditional design	The content is authentic and reliable, and has been strictly reviewed	Poor timeliness
New media design	Anyone can become a producer, with low release threshold and strong timeliness	Content quality varies
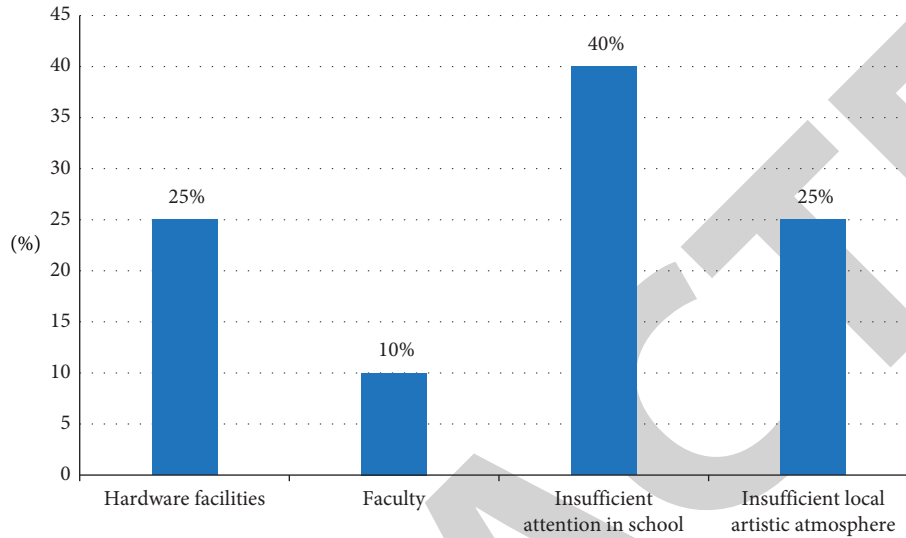
FIGURE 6: Reasons for defects in art and design education.

artistic atmosphere are also the reasons for the defects of art design education.

Defects in art design will delay the time of students and teachers and reduce learning efficiency. This paper mainly summarizes four defects (1) hardware facilities problem, (2) lack of teachers, (3) insufficient attention in the school, and (4) insufficient local artistic atmosphere. For the defects and the students, they do not like art and design, it is also the reason that the learning efficiency is not enough. This is a major that needs interest. If the students are not interested enough, it will be counterproductive.

4.5. Solutions to the Problems of Art and Design Education.

In response to the problems in art and design education reflected in 4.4, we put forward several methods to solve such problems (1) establish a characteristic school-running concept, (2) control the scale of enrollment, (3) clarify education and teaching goals, (4) optimize and adjust classrooms system, and (5) strengthen the construction of teaching staff, and at the same time, we conducted a survey on teachers and students to select more effective methods to improve the teaching quality of art and design education. The data obtained from a survey of 100 faculties and students in a school are shown in Figure 7 below.

From the diagram, we can see that among the methods of improving art and design education, the number of people who support the clear education and teaching objectives is the largest, accounting for 30%, the control of the enrollment scale accounts for 24%, and the establishment of a distinctive school-running concept accounts for 21% of the total. Strengthening the construction of teaching staff, it accounts for 15%, and the
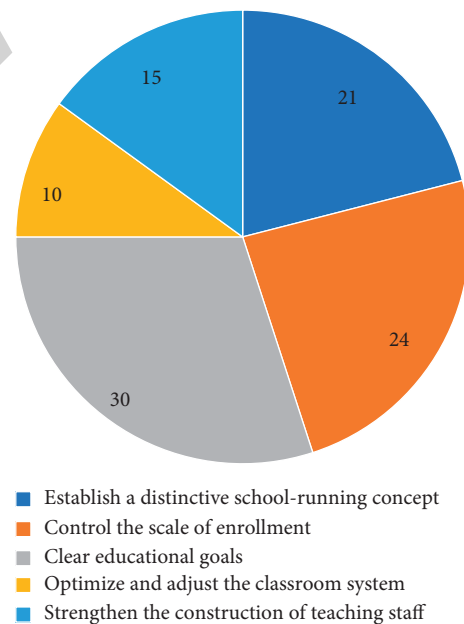
FIGURE 7: Methods for improving art and design education.

number of supporters to optimize and adjust the classroom system accounts for at least 10%. A high probability also shows that clear education and teaching goals are the most effective for teachers and students in schools.

4.6. Experiments on the Improvement of Art Design Teaching.

We explored the shortcomings and improvement methods of art design teaching, and we experimented with the

Retraction

Retracted: The Characteristics and Paths of the Dissemination of Intangible Cultural Heritage in the Form of Animation in the New Media Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] J. Luo, "The Characteristics and Paths of the Dissemination of Intangible Cultural Heritage in the Form of Animation in the New Media Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 7857816, 9 pages, 2022.

Research Article

The Characteristics and Paths of the Dissemination of Intangible Cultural Heritage in the Form of Animation in the New Media Environment

Jie Luo (ID)

School of Gannan Normal University, Ganzhou 341000, China

Correspondence should be addressed to Jie Luo; luojie@gnnu.edu.cn

In recent years, the state and even the society pay more and more attention to the protection of the intangible cultural heritage. How to effectively protect and inherit the intangible cultural heritage is the main work at present. Based on the role and influence of animation in the protection of intangible cultural heritage, this paper systematically discusses the promotion role of animation in the inheritance and dissemination of intangible cultural heritage. First, the role of animation communication in the protection of intangible cultural heritage. Finally, this paper takes the combination of intangible cultural heritage culture and animation as an example to discuss and design the combination of intangible cultural heritage protection animation and specific cases. This paper regards animation as a cultural medium, which is of great significance to the effective protection, dissemination, and inheritance of the national intangible cultural heritage.

1. Introduction

The heritage of nontraditional culture allows people to appreciate the greatness of human history on the one hand and to realize the importance of environmental energy efficiency on the other. In the process of learning about nonheritage culture, we can learn a lot about traditional handicrafts and nonindustrial forms of life and production. Web animation is a more visual, easier to understand, and more widespread way of presenting nonheritage culture. The use of web animation can raise awareness among the younger generation about the heritage and the need to save energy in the environment.

Because we do not have enough understanding of intangible cultural heritage, a lot of intangible cultural heritage is gradually dying; in terms of drama, for example, before the reform and opening up, China had more than 300 local dramas, Influenced by trendy culture, there are only a few dozen varieties left today.

The protection of intangible cultural heritage has gradually been paid attention to in recent years. This is because the original soil of the preindustrial society as intangible cultural heritage has gradually disappeared and the global integration of modern society has brought huge impact on traditional social forms. It is difficult to survive by relying on its own internal cultural system, and we must rely on external forces to protect it [1]. As a kind of spiritual inheritance, the protection of intangible cultural heritage is more about maintaining the continuation of its vitality, which is a long-term work based on the present and looking forward to the future. Therefore, the investigation, recording, preservation and subsequent dissemination, promotion, inheritance, and revitalization of intangible cultural heritage are what the protection of intangible cultural heritage in contemporary society must do [2].

2. Innovation in the Way of Dissemination of Intangible Cultural Heritage

As mentioned above, the dissemination of intangible cultural heritage is what a contemporary society must do in the protection of intangible cultural heritage. Therefore, we need to think about how to spread and through what way. Four different novel modes of propagation are listed in Figure 1.

2.1. Establishment of a Reconnection with Contemporary Life.
The vitality of intangible cultural heritage lies in the close connection with people's lives. Therefore, it is far from enough to rely only on individual inheritors to inherit within a specific cultural protection circle, which makes the inheritance isolated and closed and has almost no intersection with the life of the general public. The barrier of protection will eventually die out [3]. Intangible cultural heritage used to be an important part of our lives, so although times have changed and cultures have migrated, this way of completely detaching from life cannot gain strong vitality. Therefore, intangible cultural heritage should be flushed with modern life to establish a connection. Although it cannot return to the core position of people's production and life, it can return to people's life as a part of cultural composition [4]. For example, due to the broadcast of the cartoon "Lucky Star," the number of visits to the Chu Palace Shrine has increased year by year, as shown in Figure 2.

2.2. Reconstruction of Intangible Cultural Heritage Functions.
The main function of intangible cultural heritage is to spread ethnic culture and increase cultural confidence. For example, paper-cutting can be used as decoration and tie-dyeing technology can be used as clothing dyeing. Due to the development and progress of science and technology, people's production and lifestyle have been completely different from the original, which has led to the gradual disappearance of the original use function of many intangible cultural heritages, which is one of the main reasons for the difficulty of inheriting intangible cultural heritage. Whether the functionality can be re-realized is an important basis for considering whether the intangible cultural heritage can continue to develop and survive [5]. Therefore, in modern society, it is necessary to rebuild the functionality of intangible cultural heritage with the help of new conditions and technologies, so that it can continue to be passed on proudly.

2.3. Recultivation of Cultural Identity.
If a culture wants to have a strong vitality, the identity of the people as a communication medium is very important. A good cultural atmosphere can provide fertile soil for the inheritance of intangible cultural heritage. People recognize this culture, understand its cultural value and connotation, and realize the importance of protecting intangible cultural heritage, so as to build a good atmosphere for intangible cultural heritage protection [6]. It also makes the people themselves consciously realize their important role in the inheritance of
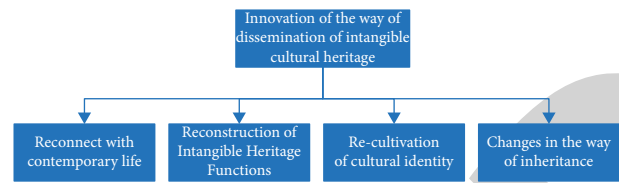
Figure 1: Innovation in the way of dissemination of intangible cultural heritage.
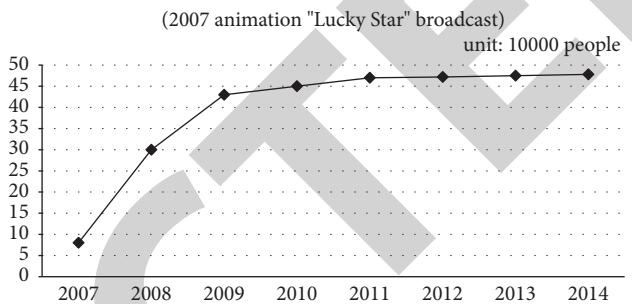
Figure 2: Changes of the number of visits to the animation Lucky Star and the Chu Palace Shrine.

intangible cultural heritage, so that human beings can spontaneously protect and inherit the intangible cultural heritage.

2.4. Changes in the Way of Inheritance.
For the inheritance of intangible cultural heritage in the contemporary cultural context, in addition to the reconnection with people's lives, the reconstruction of functions, and the recultivation of cultural pride mentioned above, it is also necessary to take measures to improve the spontaneous inheritance of intangible cultural heritage [7]. Borrowing external forces to promote the inheritance of intangible cultural heritage, the search for new media bears the brunt. As a sunrise industry, animation has a natural property of integrating with modern fast-paced cultural dissemination. As a pioneer representative of visual culture and an important part of contemporary cultural industry, animation is very suitable for the inheritance of intangible cultural heritage as a new media [8]. The communication mode of the animation industry in the intangible cultural heritage is shown in Figure 3.

3. The Feasibility Analysis of the Communication Characteristics and Communication Paths of the Intangible Cultural Heritage Animation in the New Media Era

3.1. The Communication Characteristics of the Intangible Cultural Heritage Animation in the New Media Era.
In the process of protecting intangible cultural heritage, it is particularly important to preserve relevant data materials. The protection of folk art is the core part of the process of intangible cultural heritage protection. The inheritance and development of folk art are essentially the inheritance and
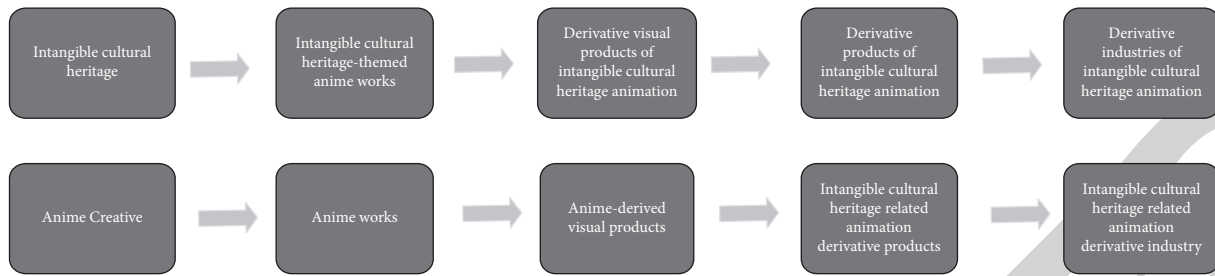
Figure 3: Industrialization mode of intangible cultural heritage animation.

development of the national spirit and culture. The study of historical and cultural heritage needs to reflect the textual nature of history. With the characteristics of diversification and life, folk art has played a unique cultural function in modern civilization, which is very important to strengthen national unity and enhance people's sense of collective identity. From a historical point of view, folk art is an important guarantee for maintaining the diversity of human culture and the foundation for the healthy development of the cultural ecosystem [9]. At the same time, the relevant personnel also encountered some difficulties in the process of protection. The dissemination of intangible cultural heritage is a dynamic transmission with human beings as the carrier, which is transmitted by oral transmission [10]. This inheritance method is very dependent on the inheritors, and it is very easy to cause the decay or loss of cultural connotations in the process of dissemination. With the continuous advancement of globalization and digitalization, the emergence of new forms of media has brought a certain impact on the dissemination of intangible cultural heritage. The traditional dissemination and promotion of intangible cultural heritage mainly relies on oral, written, picture, and other forms; if the original mode of communication is continued without innovation, intangible cultural heritage may face the embarrassing situation of being snubbed. We have to think about new channels and ways of disseminating intangible cultural heritage. In the face of the transition between tradition and modernity, intangible cultural heritage culture needs to be combined with the form of animation, which plays an important role [11]. Animation in the protection and dissemination of intangible cultural heritage mainly can be carried out through the three latitudes as shown in Figure 4.

3.1.1. Animation Works Can Better Protect and Express the Essence of Folk Art.
At present, our country mainly protects and develops folk art by applying folk art forms as intangible cultural heritage projects, systematically sorting out folk art, selecting inheritors and cultivating them, and rationally developing projects with economic value. In the process of protecting and inheriting intangible cultural heritage, the protection concept of relevant personnel is relatively old and the technology is single. They only preserve and record the intangible cultural heritage by means of photography, recording, or physical collection, and these preservation methods may change over time. The passage of time leads to
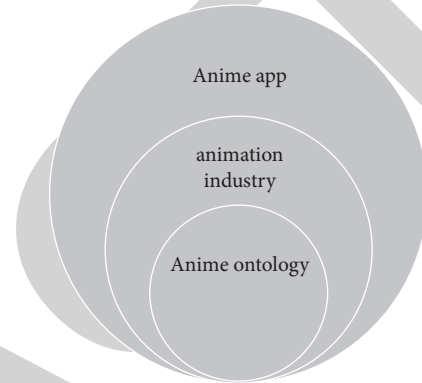
Figure 4: Three dimensions of anime.

the distortion of some information. As a new medium, animation works preserve the essence of folk art in digital form, which can be a useful supplement to the traditional record and preservation work [12].

3.1.2. Animation Works Can Play a Good Role in Inheritance.
The audience of animation products is very wide, and the vividness of animation has a strong appeal to young people. In recent years, with the continuous development of the animation industry, a large-scale group of animation enthusiasts has formed among the youth groups and even the adult groups. These fans maintain high enthusiasm for domestic animation works, such as "Journey to the West: The Return of the Great Sage" and "Big Fish and Begonia" in recent years, which have caused quite a stir. Animation works with excellent traditional cultural themes can express excellent traditional art, promote excellent traditional culture, activate the national enthusiasm and cultural enthusiasm of the younger generation, enhance their sense of national pride and identity, enhance the interest of young people in traditional culture and art, and make folk culture and art get a better inheritance [13]. For example, the soul of the Japanese anime directly affects the number of Japanese participants in Go, as shown in Figure 5.

3.1.3. Animation Is Conducive to the Sound Development of the National Cultural Industry.
The animation industry is a cultural and creative industry, and animation creators need to have advanced and avant-garde creative concepts and skills. However, looking at the excellent animation works of
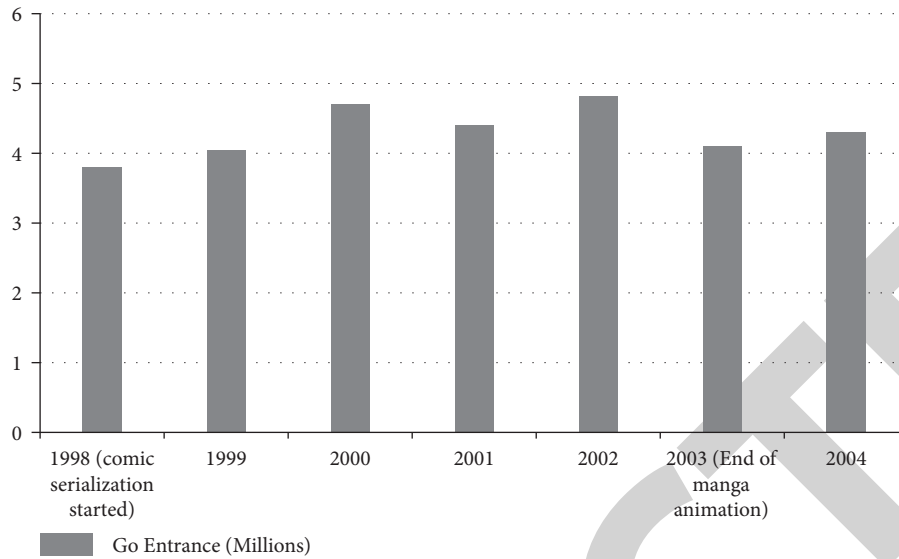
Figure 5: Population change chart of Go Soul and Japanese Go.

different countries, distinctive national characteristics are the basis for their long-term development. Only animation works with unique national character can have product differentiation and improve their competitiveness in the international cultural market. Animation works have a strong cross-cultural communication ability. In order to exert this ability, animation creators need to find a basis from the excellent cultural and artistic traditions of their own nation. Today, with the deepening of the process of globalization, the trend of interpenetration and integration of cultures among different civilizations and nations is increasing. Under this background, in order to achieve good development of domestic animation, it needs to be effectively integrated with intangible cultural heritage, which is also a necessary means of disseminating and protecting national intangible cultural heritage and is of great significance for ensuring the safety of national culture [14].

3.2. The Feasibility of Nongenetic Inheritance Using Animation as a Medium. The subject matter of animation can be described as all-encompassing, from sci-fi adventure to campus romance to sports humor. Therefore, the dissemination of intangible cultural heritage by animation is also diversified.

3.2.1. The Breadth of the Creative Subject Matter. The wide range of performance themes just proves the strong integration ability and expressive power of animation to culture. The wide range of themes is the fertile soil for animation to grow, showing us the excellent culture of the genre and conveying the connection between nature and human society [15].

3.2.2. Diversity of Performance Materials. The essence of animation is "the art of motion." As long as it is the material that can be applied to animation shooting and form motion, it can be used as the object of animation performance. The use of different materials can bring more expressiveness and tension to the expressiveness of animation. With the advent of the digital age in today's society, optical virtual animation based on computer technology uses computer three-dimensional virtual animation to complete the corresponding three-dimensional model construction. It can realistically and directly build an actionable visual virtual reality scene for the user, completely separated from the performance of physical materials, bringing new creative vitality to the performance of animation.

3.2.3. Compatibility of Artistic Application. As a comprehensive art, the compatibility of animation with other disciplines such as literature, music, sculpture, and dance is unmatched by other art forms. The absorption and transformation of excellent literary works in animation creation, the use of excellent musical works in sound, and the reference to sculpture and dance in art design all reflect the compatibility and breadth of an art form [16].

3.2.4. Diversity of Forms of Communication. The form of communication of animation has changed from the early paper media such as newspapers, magazines, and comics, to the medium of television as the main communication medium, to the network as the main communication medium in contemporary society. No matter which period the animation media has a strong audience base, its popularity is unmatched by other art forms. From a macro point of view, the communication forms of animation cover all aspects from traditional media to new media, and an open and flexible communication system has been spontaneously formed [17].

3.2.5. Rich Intangible Cultural Heritage Resources Provide Materials for Animation. Our country's intangible cultural heritage resources are rich in different forms. As of December 31, 2019, according to relevant statistics, there are

3,145 intangible cultural heritage items in my country, which are divided into folk literature, traditional music, traditional dance, traditional drama, folk art, traditional sports, entertainment and acrobatics, traditional art, traditional Skills, traditional medicine, and folk customs comprising 10 categories. These various types of intangible cultural heritage have high artistic and cultural value and continue to provide rich materials for animation creation in our country, as shown in Table 1.

3.2.6. The Combination of Intangible Cultural Heritage Culture and Animation Has a Long History.
With a long history of combining intangible cultural heritage culture with animation, Table 2 integrates relevant specific information.

3.3. The Dissemination Path of Animation of Intangible Cultural Heritage in the Era of New

3.3.1. Strengthening Psychothematic Analysis.
Although the dissemination of intangible cultural heritage by means of animation will weaken the charm of intangible cultural heritage, in order to make it spread, it is also necessary to spread intangible cultural heritage by means of animation. The dissemination of intangible cultural heritage by means of animation is actually a second creation of intangible cultural heritage. China's intangible cultural heritage contains the outstanding wisdom and cognitive experience accumulated by the ancestors of the Chinese nation for generations, as well as the spiritual connotation of traditional culture such as continuous self-improvement and virtue for generations, providing strong cohesion and inexhaustible creativity for the Chinese people. As a creator, we must be able to grasp the theme spirit of intangible cultural heritage as much as possible and be able to grasp its core connotation. Based on this, we carry out animation processing and try to display the essence of intangible cultural heritage, so that the dissemination of intangible cultural heritage has practical value. Specifically, if the creation is too heavy, it is necessary to seriously study the ecological structure of the intangible cultural heritage, the human situation, and the philosophy of life. Its spiritual qualities are effectively disseminated. Animation creators must be able to study nonmaterial cultural works in depth, to deeply grasp their connotations, and to grasp their spiritual qualities. In line with the esthetic needs of modern people, it can also show the spiritual quality of intangible cultural heritage as much as possible. In this way, intangible cultural heritage can be disseminated so that people can deeply appreciate the spiritual charm and cultural charm of intangible cultural heritage through phenomena. This kind of dissemination has real value.

3.3.2. Scientifically Building Image Pedigree.
In the era of new media, in order to realize the animation dissemination of intangible cultural heritage, it is necessary to be able to scientifically construct the image genealogy, that is, animated films must continuously enter new content and create an innovative cultural environment, as the most novel cultural form, which is the basic guarantee for its effective dissemination, as shown in Table 3. To scientifically build an image pedigree, we need to be able to analyze the characteristics of intangible cultural heritage, and combine the advantages of new media to create an animation image brand that belongs to intangible cultural heritage. This animation image brand can effectively enhance the influence of intangible cultural heritage and enhance the market competitiveness of animation products, so that intangible cultural heritage can be effectively disseminated.

3.3.3. Analysis of Esthetic Appeals.
The animation design of intangible cultural heritage needs to be able to analyze the aesthetic appeal of modern people. As a kind of traditional culture, intangible cultural heritage is produced in a specific historical period, and its esthetic expression cannot well meet the aesthetic needs of modern people, which is also an important reason for the difficulty of dissemination of intangible cultural heritage. To carry out animation design and dissemination of intangible cultural heritage through animation, it is necessary to be able to carefully analyze the esthetic appeals of modern people and to be able to effectively design the manifestations of intangible cultural heritage based on the esthetics of modern people. Through animation design and creation, intangible cultural heritage can be welcomed by the audience. In the process of creation, creators should be able to deeply study the spiritual connotation of intangible cultural heritage, and should be able to design artistic situations that are compatible with classic works. It is closer to the esthetic appeal of modern people. In this way, intangible cultural heritage can be effectively disseminated by means of animation, and its sustainable development and creative development can be guaranteed.

Chinese ink painting is a traditional element in Chinese animation. In the expression of situations and the creation of artistic conception, the artistic elements of ink painting are widely used and have strong performance advantages. In the animation design, many works are designed with the artistic element of ink painting which renders an atmosphere and conveys a national spirit. This design also meets the aesthetic needs of modern people. Therefore, this ink painting anime design is very popular.

3.3.4. Creation of Animation Works with the Theme of Intangible Cultural Heritage.
In order to solve the problem of the marginalization of intangible cultural heritage elements in animation works, my country should vigorously support the creation of animation works with intangible cultural heritage as the theme at this stage. In 2004, our country's CCTV Variety Channel launched an animation column with the theme of intangible cultural heritage, "Happy Station," which performed intangible cultural heritage projects such as Chinese classic humorous comic dialogue, storytelling, and sketches in the form of animation. After the program was broadcast, it not only received unanimous praise from middle-aged and elderly audiences who love traditional folk art but also had a warm response among young people, which had a positive impact on

Table 1: Rich intangible cultural heritage resources provide materials for animation.

The Eight Immortals Crossing the Sea", "The Story of Avanti", "Da Yu's Control of the Flood" and "White Snake: The Origin"	Based on Chinese folk tales
"Havoc in Heaven" and "The Return of the Great Sage"	The soundtrack draws on traditional musical elements such as Peking Opera, Kunqu Opera, and Guangdong Cantonese Opera
"Fisher Boy", "Gourd Brothers" and "Monkey Fishing for the Moon"	The soundtrack are paper-cut animations based on traditional art creations
"Legend of Shaolin" and "Go Boy"	Draw on traditional sports, entertainment and acrobatics intangible cultural heritage projects
"Herbal Family" and "Ben Herbal Spirit"	Take traditional medicine as the theme
"Dao Xi"	Takes the inheritance of Hunan "Dong Brocade" as the main line

Table 2: The combination of intangible cultural heritage culture and animation history.

1940s	"Princess Iron Fan"	Paper cutting, puppets, fine brushwork, ink painting, shadow play, etc.
From the 1960s to the end of the 1980s	"The Proud General" and "Havoc in Heaven" "Mud Flute" "Little Tadpoles Looking for Mother" "Nine Colored Deer" "Landscape Love"	For example, the classic image of Monkey King in "Havoc in Heaven", its facial design absorbs the elements of Peking Opera masks, and the costumes incorporate tiger skin skirts, drill hats and other elements commonly seen in operas, and use the form of folk prints to outline the character as a whole. In "Nezha Nao Hai", the shape of the Dragon King is inspired by folk paper-cuts and New Year pictures. The music in these animation works is also played with traditional musical instruments such as drums, cymbals, and suonas, reflecting the strong characteristics of traditional drama.
After the 21st century	"The Legend of Panhu" "Cai Lifo, the Hero of Star Ants"	At the beginning of production, it is consciously combined with intangible cultural heritage, which is a great progress, which can break through the shackles of inherent communication forms and attract the interest of young people.

Table 3: Scientifically constructed image pedigree.

In the dissemination of Chinese opera culture	Using animation expression to display traditional opera stories, designing the story situation through secondary creation, and enriching and perfecting relevant details, this animation product is more artistic, and the dissemination of Chinese opera in this way can make the audience feel Chinese opera has a more profound impression, so that the effective dissemination of Chinese opera art can be realized.
During the adaptation of the classic opera "The Legend of the White Snake"	During the animation adaptation process, the creators made a scientific construction of the image pedigree, and effectively displayed the surrounding scenery of the West Lake through delicate and elegant traditional ink brushwork, creating a fresh and elegant artistic atmosphere. In terms of character image design, the creators used exaggerated methods to display the character characteristics of the characters, which effectively enhanced the impact of the image. The appeal of the work enables the widespread dissemination of intangible cultural heritage

the inheritance of traditional folk art. Intangible cultural heritage has not received much attention among contemporary youth groups, and inheritance is faced with the dilemma of no successor. Under this situation, the cultural connotation of intangible cultural heritage should be fully explored, and different animation expressions should be adopted to display intangible cultural heritage under the premise of grasping the characteristics of different types of intangible cultural heritage items as shown in Table 4.

It is worth noting that when creating art forms, the authenticity of intangible cultural heritage should not be neglected, and the relationship between entertainment and seriousness should be well handled, so as to stimulate young people's interest in intangible cultural heritage and encourage them to devote themselves to the development of intangible cultural heritage inheritance.

3.3.5. Building a Professional Intangible Cultural Heritage Animation Creation Team. The animation of intangible cultural heritage is a complex task. The final effect of the work is not only reflected in the visual perception but also depends on the content of the work, which requires the joint participation of talents from all parties. Excellent animation designers can ensure the artistry of the work, and the participation of intangible talents ensures the authenticity and accuracy of the work. The lack of any talent will lead to the failure of the work. Therefore, our country should vigorously cultivate animation creative talents with innovative consciousness and production ability, and at the same time, it should also attract more intangible cultural heritage talents to participate in animation creation and build a professional intangible cultural heritage animation creation team.

TABLE 4: Different ways of expressing intangible cultural heritage in animation.

Folk literature	This kind of intangible cultural heritage that is mainly narrative can show the storyline through the direct creation of cartoons.
Other types of intangible cultural heritage	This can use the existing well-known animation images to promote intangible cultural heritage or use 3D animation technology and VR technology to create a virtual animation scene, the audience can watch the intangible cultural heritage project up close and even participate in it.

3.3.6. Increasing the Popularization of Intangible Cultural Heritage Elements in Works. There are many works involving intangible cultural heritage elements in domestic animation, but there are very few related introductions to the intangible cultural heritage elements. As a result, some audiences are attracted by the intangible cultural heritage elements in the works and want to know more about them, but they cannot find more relevant information. The animation production team can mark the intangible cultural heritage elements borrowed from the work at the end of the subtitle, so that the audience has a general direction and can check the relevant information on their own. At the same time, the production team can also use social media such as Weibo to publish popular science articles or related introduction videos of the intangible cultural heritage projects involved in the work, so as to increase the public's understanding and familiarity with intangible cultural heritage and promote the inheritance of intangible cultural heritage [18].

In a word, intangible cultural heritage originated in a specific historical period and a specific historical culture. As an important carrier of national culture and national spirit, it plays a positive role in the dissemination of traditional Chinese civilization. Therefore, strengthening the inheritance and protection of intangible culture is very important. In the new era, people's life rhythm has been accelerating, and esthetic needs have also undergone great changes [19]. People's attention to intangible cultural heritage has gradually declined, and it has become more difficult to spread intangible cultural heritage. In this case, in order to realize the inheritance and dissemination of intangible cultural heritage, it is necessary to carry out animation design of intangible cultural heritage based on the needs of the development of the new media era and to carry out intangible cultural heritage dissemination in the way of animation. In this way, the traditional art elements are recreated to meet the esthetic needs of modern people. Only in this way can we effectively create a unique brand of intangible cultural heritage and promote the innovative development of intangible cultural heritage [20].

4. Case Analysis of the Inheritance and Dissemination of Intangible Cultural Heritage Animation Industrialization

4.1. Inheritance and Dissemination of Animation Industrialization of Intangible Cultural Heritage—Taking Yinxu of Anyang as an Example. The animation industrialization of intangible cultural heritage refers to the combination of intangible cultural heritage and the animation industry, and through the integration of resources, the intangible cultural heritage becomes a cultural resource and a source of creativity for animation creation, so that it can participate in animation creation, derivative development and industry in operation. We will take Yin Ruins in Anyang, Henan Province as an example to discuss specific and implementable cases of intangible cultural heritage animation and animation industrialization, to highlight the feasibility of intangible cultural heritage with animation as the way of communication.

4.1.1. Animation Creation: The Transformation of Intangible Cultural Heritage to Animation Symbols. The original obscure oracle bone script was transformed into animation language and expressed in the form of modern animation to establish its connection with the animation industry. Creativity is the source of power for the cultural industry. It runs through the entire industry, and cultural products produced with creativity as the driving force are the most intuitive visual manifestations. Taking intangible cultural heritage as the source of cultural creativity refers to taking intangible cultural heritage elements as the object of animation creation and using intangible cultural heritage as the content of animation performance, so that intangible cultural heritage can be integrated into the animation industry chain.

4.1.2. Cultural Derivatives: Diversified Dissemination of Intangible Cultural Heritage. In the context of contemporary cross-media communication, animation visual derivatives are an important part of animation products and are visual cultural products that use existing animation symbols to develop other types of media and functions. The development of animation visual derivatives provides more communication channels for animation symbols, and at the same time, enriches their forms of expression and presentation. Animation, games, and cultural and creative products are all available channels. Oracle bone inscriptions and modern Chinese have a natural inextricable relationship which is very suitable for the development of early childhood education products of Chinese characters for children and can also be developed in the form of the most popular modern mobile phone app. The shape is transformed into an animation image, and the origin of modern Chinese characters is linked to the origin of oracle bone inscriptions.

4.1.3. Physical Derivatives: New Functional Construction of Intangible Cultural Heritage. The development of animation physical derivatives refers to the development and sales of physical products of related animation symbols and contents through the grant of animation copyrights. The development of animation physical derivatives is the most direct means of adding value to animation symbols, and it is

also an important link for the animation industry to promote the related manufacturing economy. The "complex" caused by the cartoon symbols condensed in the physical products is the biggest attraction for consumers. At the same time, in the process of physical development, intangible cultural heritage has unconsciously formed new functions. In the contemporary era of advocating individuality and trends, young people are very fond of individual culture. The shape of oracle bone inscriptions is a very individual cultural symbol. Wearing it directly as a kind of jewelry not only satisfies young people's pursuit of individuality but also using people as a communication medium has also played a very good role in the spread of Oracle. This is actually a new construction of the functionality of the intangible cultural heritage, which migrates the original recording and communication function of oracle bone inscriptions into the modern cultural aesthetic function, satisfies the pursuit of individual culture, and activates the new function of intangible cultural heritage.

4.1.4. Combining with Contemporary Tourism. Combining animation with intangible cultural heritage and tourism refers to a series of tourism products formed by combining animation resources with local tourism resources. There are two modes for packaging tourism by symbolizing intangible cultural heritage animation. First, we symbolize intangible cultural heritage items with animation to enhance their appeal to the audience. We can carry out animation packaging for the image of the explainer, for example, let him dress as the image of an ancient cartoon character, which can make the audience more immersive than the modern professional dress. Second, we develop cartoon images to create highly recognizable symbols for intangible cultural heritage tourism projects.

4.2. Inheritance and Dissemination of Animation Industrialization of Intangible Cultural Heritage—Taking the Resource River Lantern Festival as an Example. We will take the Resource River Lantern Festival as an example to discuss the specific and implementable cases of intangible cultural heritage animation dissemination.

4.2.1. Improving the Quality of Intangible Cultural Heritage Content Dissemination. With the rapid development of new media, their relevant content and form are very critical. Therefore, it is necessary to combine the development of the Internet to create more high-quality works. Through new media, designers can use new media technology to create animation materials, and can also obtain more materials through network channels. In the design of the works, through the use of nonperspective composition, multiple viewpoints in ancient Chinese painting, and ethnic color elements, the boring traditional text introduction to the River Lantern Festival has been transformed into novel and visual animation works. At the same time, dynamic illustrations are used to make the picture more rich and interesting. Finally, you can disassemble the elements of the River Lantern Festival, make stamps, tapes, bookmarks, posters, and other products, play with creativity, design derivatives, outline static and dynamic cultural surroundings, and make it more widely used.

4.2.2. Making Full Use of New Media Forms to Innovate Network Communication Channels. At present, the River Lantern Festival, which is an intangible cultural heritage, is mainly concentrated on news websites. From this point of view, we should make reasonable use of various channels and forms of existing network communication, so as to cover more netizens more effectively and achieve the effect of expanding communication. In terms of visual communication, H5 video can be produced. The meaning of river lanterns, worshiping gods and ancestors, birds and beasts, flowers, birds, fish and insects, Baolian blessings, scenic spots, festivals and activities and special neighborhoods, special food, and special residential properties will be introduced in the "interactive videos" is presented one by one, so that the culture of the River Lantern Festival can be presented to the public in the form of information visualization. It is also possible to create a digital resource He Lantern Festival special website, fully consider the acceptance habits of Internet users, and use a variety of symbolic media such as text, pictures, sound, and video.

4.2.3. Using Social Network Media Skillfully for Dissemination. The emergence of new media has brought more convenient communication methods to the animation industry. Various websites, platforms, and apps for the animation industry emerge in an endless stream. Not only are there various types, but also the number of online users is on a linear upward trend, which greatly broadens the dissemination channels of animation. IMoreover, in addition to animation works, a series of animation derivatives can also be produced, which makes the development trend of animation works appear diversified. In addition, with the gradual popularization of the Internet and the continuous development and maturity of network technology, "interaction design" can also be used in the dissemination of animation works. In this context, we can use WeChat public account, Weibo, major self-media platforms, etc., with the help of the Internet, short videos, mobile phones, and other technologies to disseminate animation works that consumers love to hear and provide users with effective science resources for the River Lantern Festival.

5. Conclusion

This paper explores and studies the ways in which intangible cultural heritage can be disseminated and transmitted in the new media era. After demonstration, it was found that animation, as a medium and form, can be effectively combined with intangible cultural heritage and promote the inheritance and dissemination of contemporary intangible cultural heritage. By analyzing the survival dilemma of intangible cultural heritage due to the loss of its original function in the contemporary cultural context, this paper

Retraction

Retracted: University Network and New Media Advertising Teaching Design Features and Influence: Environmental Perspective Analysis in Campus Humanistic Governance

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] J. Zhang, "University Network and New Media Advertising Teaching Design Features and Influence: Environmental Perspective Analysis in Campus Humanistic Governance," *Journal of Environmental and Public Health*, vol. 2022, Article ID 6380719, 11 pages, 2022.

Research Article

University Network and New Media Advertising Teaching Design Features and Influence: Environmental Perspective Analysis in Campus Humanistic Governance

Jing Zhang [iD]

Department of Literature, Modern College, Northwest University, Xi'an 710130, China

Correspondence should be addressed to Jing Zhang; 631607010301@mails.cqjtu.edu.cn

Under the background of network development in the new era, the integration of multimedia technology and information technology promotes the development of teaching environment. Based on the influence of humanistic governance environment, the university network environment and the advertising teaching environment are constantly integrating new elements with the development of the times, becoming the key point to guarantee the teaching quality. In the research, the relevant data and information were collected and analyzed by the methods of inference and induction analysis. According to the sensory parameters of students' cognitive emotions ($n = 64$, $a > 0.847$), the standard deviation was 0.810/0.695 and the action was 0.927/0.655. How to construct the university network and advertising teaching environment were explored. And, in view of the design of the environment characteristics as well as the impact on students, the purpose was to ensure that students had a good learning environment, which could improve the learning efficiency.

1. Introduction

At present, a good learning adaptability is an inevitable requirement to improve the quality of talent training in the era of knowledge economy. Under the influence of campus humanistic governance environment, the teaching environment design of university network and new media advertising has a direct impact on students' learning quality. In the past, students had problems of maladaptation in the process of learning and the influence of learning environment on students led to the lack of adaptability [1]. As for the existing problems, designing a quality environment mobilizing students' self-efficacy in learning has a direct and significant impact on learning adaptability. Three rounds of teaching practice were carried out to verify the effect of the intervention model from two aspects of students' procedural performance and result-oriented performance. According to the implementation effect of each round, the intervention model and its application were reconsidered and improved to gradually improve the learning adaptability of university

students [2]. In the environment governed by humanities colleges and universities, the use of advanced network and new media teaching has a positive impact and importance on reducing the pollution and carbon emissions produced by the traditional teaching process. Therefore, adopting advanced network teaching means is conducive to environmental protection. On the other hand, taking the methods of new media–related technology can create an environment of clean and green space.

As the representatives of the emerging technology, Mobile Internet, cloud computing, and virtual reality technology present a blowout development, which reconstructed social economy, cultural life, and other aspects. They are integrated in all walks of life rapidly, so that more ordinary consumers can also deeply participate in the process of scientific and technological innovation, and further drive the evolution of social innovation form [3].

Advanced concepts such as "digital indigenous people," "Internet +," "smart education," "maker education," and "core literacy" are constantly changing people's minds. For

these changes, China has implemented the "Primary and Secondary School Teachers Training Projects," "Modern Distance Education Project of Rural Elementary and Middle Schools," "Three Links and Two Platforms Construction," and other series of education informatization strategic projects. But the integration between modern information technology and education is far behind the other industries. The situation of rural areas and underdeveloped areas is not optimistic. "Integration" has become a "high-frequency word" in the policies and guidelines of educational institutions at all levels and a hot topic for researchers and practitioners [4]. With the confusion of the above problems, the classroom development mode of higher-order thinking supported by technology as the research topic was chosen to enrich the influence of environment on the development of higher-order thinking and its rules through technology. The general theoretical and practical model was explored, which provided theoretical, practical, and methodological perspectives for the research on the development evaluation of higher-order thinking, development strategies, cognitive diagnosis, and teaching intervention. More importantly, it was expected to trigger some thoughts on the improvement and better development of the integration of educational informatization and technology. Therefore, the relationship between technology and thinking development was the starting point of the research. Technology-enriched environmental features and interpretation of higher-order thinking ontology were the bases of the research. The core task of the research was to enrich the influence of the classroom environment on the development and change of higher-order thinking, and how to build an operable higher-order thinking development model [5]. The specific problems are sorted out, as shown in Figure 1.

What is the status quo of the cultivation and development of higher-order thinking? What factors and conditions is it affected by? It is found that higher-order thinking began to attract attention from 2008 and then it has been on the rise. Through the research on the cultivation mode, development conditions, supporting environment, and influencing factors of higher-order thinking, it is found that the research categories and perspectives are diverse [6]. The research categories and perspectives are diverse and unfocused. It is mainly based on the research of a certain technology or a certain discipline with higher-order thinking goals. From the technical perspective, it mainly focuses on information technology, network environment, and digital resources, which can be specifically divided into social software, semantic web, Wenqest, gamification teaching, flipped classroom, etc. From the theoretical perspective, it includes constructivism, cognitive apprenticeship, deep learning, and so on. From the perspective of teaching and learning activities, it includes teaching design, digital environment design, learning mode, teaching strategy, teaching mode, and so on. Learning methods include problem solving, exploration, research, etc. High frequency words are technology and its role, thinking environment, resource type, learning mode, learning behavior, teaching mode, teaching behavior, teacher knowledge, student experience, teaching problem-

solving strategies, and so on [7]. Among them, the difference between high-order thinking and low-order thinking is shown in Figure 2.

It is guided by high-order teaching objectives and driven by real problems or tasks, which focuses on meaningful learning and integration with specific teaching. Information technology is as a learning tool and intelligent partner of learners. It creates learner-centered learning environment and changes the roles of teachers and learners. It creates an ideal interactive environment to promote development through evaluation. It also provides a theoretical framework for the teaching design of higher-order thinking by means of semantic composition of target, learning task, teacher role, information technology role, learning evaluation, and learner role in the whole hypothesis model [8], as shown in Figure 3.

2. New Media Concept and Basic Theory

Advertising image is one of the basic elements of information construction and plays a particularly important role in advertising information dissemination. However, in the new era of social culture and intelligent technology integration, advertising forms are also evolving, including the new connotation of advertising language, namely, language image. In the era of new media, it is more and more difficult for single and static advertising to ensure the effectiveness of advertising information transmission, while advertising design completed through multi-dimensional, virtual reality, media interaction, and other ways is more and more popular. Advertising information achieves the two-way transmission and the connotation of advertising is also evolving [9]. A series of artistic design rules such as rhythm, balance, contrast, and unity are used to better express the sense of form and beauty of advertising. This can be called the language of advertising. Images in the new media era focus on "communication," that is, two-way interaction, which requires the further expansion of comprehensive sensory and thinking cognition of the target groups. See Table 1.

The connotation of new media advertising language image and image is constantly expanded and extended in the interaction of environment, until dynamic, until apperception sharing. It shows different degrees of stereoscopic deepening and mutual integration both horizontally and vertically. In a sense, the language image can also be a kind of image. And the image can also be continuously expanded and extended in the interaction of a kind of context until it becomes dynamic and even apperception sharing [10]. Horizontally and vertically, it shows different degrees of stereoscopic deepening and mutual integration. In a sense, language image can also be a kind of image and image can also be a kind of language image. The two gradually move from disjoint parallel relationship to symbiosis, as shown in Figure 4.

In the research, apperception sharing mainly refers to how the language image elements and the audience's perceptual experience are skillfully combined to achieve harmony and unity in new media advertising. The relationship between language image and apperception sharing is a two-
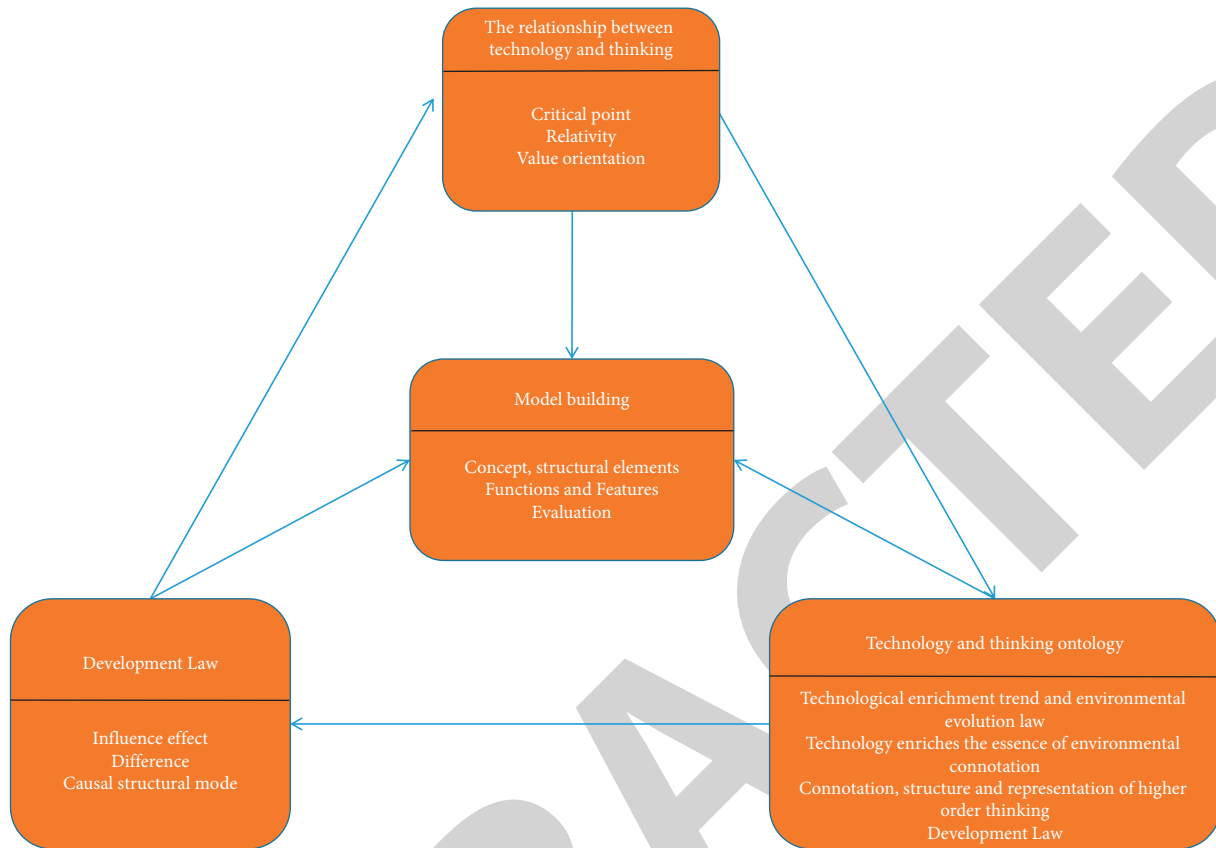
Figure 1: Presenting the problems.
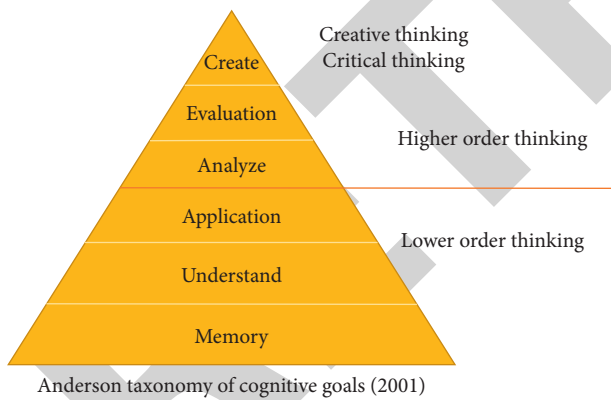
Anderson taxonomy of cognitive goals (2001)

Figure 2: High-order thinking and low-order thinking.

way interaction. The combination of language image and image provides the medium and form for the realization of apperception sharing. Conversely, the realization of apperception sharing further provides feedback for new media advertising. As shown in Figure 5, the two-way interaction between the two is further towards "integration" [11].

For the focus of new media advertising research, language symbols can convey the meaning of advertising content. The advertising language symbol is located in the middle layer. The innermost layer is the representation of the advertising content and the outer layer is the perception and

interaction of the advertising audience. It can be called "concentric circle" relation in new media advertisement. As shown in Figure 6, it is the semiotic basis to further explore the relationship between them [12].

When language symbols are used in new media advertising, the connotation of advertising language symbols also deepens between language symbols and advertising images, and its connotation even goes beyond the description of advertising images. The mutual contradiction is also the basis and condition of the interaction between language image and image to realize "sharing," as shown in Figure 7 [13].

Due to the understanding of the human brain and the subjective active role in understanding objective things, it has a certain degree of masking and concealment. Its deep meaning is often not easy to detect, so we often only see some visual illusions to believe in it. The image of new media advertisement has the division of connotation layer and epitaxial layer. In addition to the surface information, there is also the deep meaning of mixed information. Its structure is shown in Figure 8.

In addition, the transmission of new media advertising information is based on "common experience." It relies on the shared experience between the advertising designer and the advertising recipient group, and eventually forms the intersection set of brain ideas, contributing to what we call the new media advertising symbols with conventional characteristics, as shown in Figure 9.
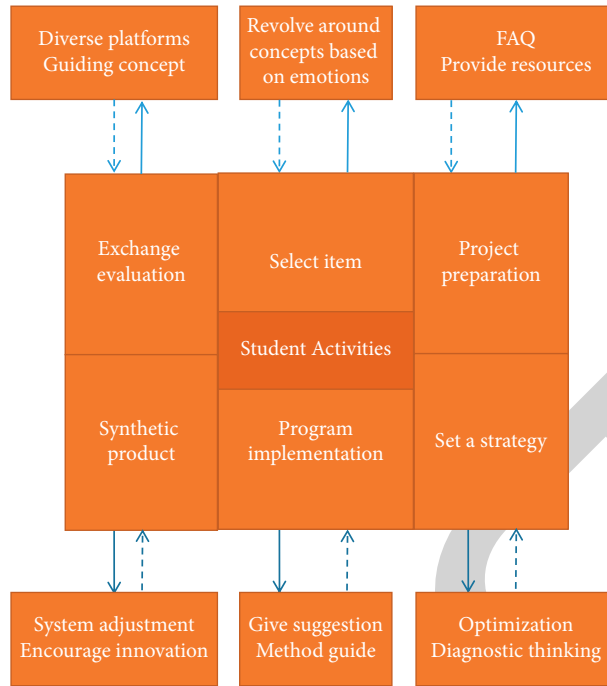
Figure 3: Hypothesis model of thinking teaching design.

Table 1: Changes of connotation of advertising language image.

Advertising image	Form	Content	Characteristics	Summary
Traditional advertising image	It has a fixed form. It is attached to a specific medium	Advertising language, text, etc., to explain advertising information	Two-dimensional, unidirectional, stationary	Advertising language and social conventions commonly known as word signs
New media advertising image	There is no fixed form. Digitize. Advertising information is displayed in the form of digitization	Communication elements and forms of advertising information	Three-dimensional, two-way interaction, apperception sharing	All media and means used to perceive, communicate, communicate, , and deliver advertising information
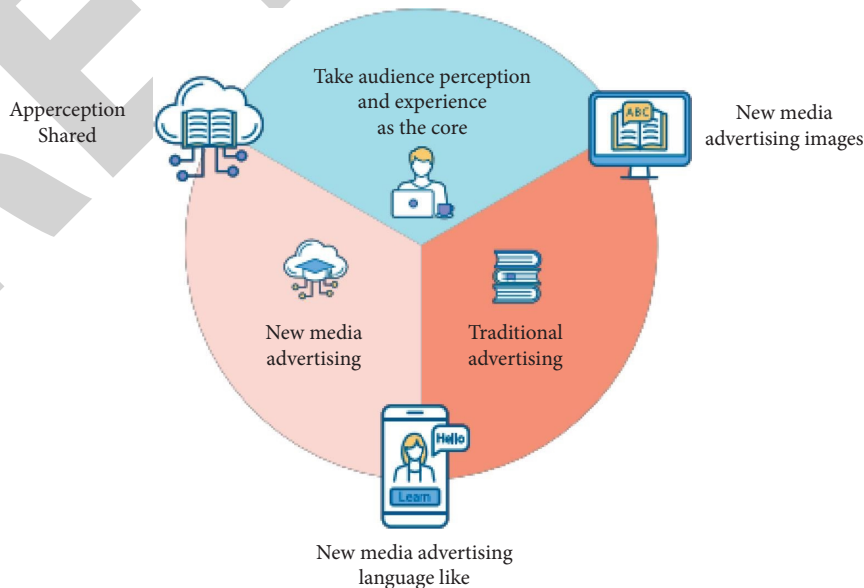
Figure 4: The extension and expansion of the connotation of language image and image.
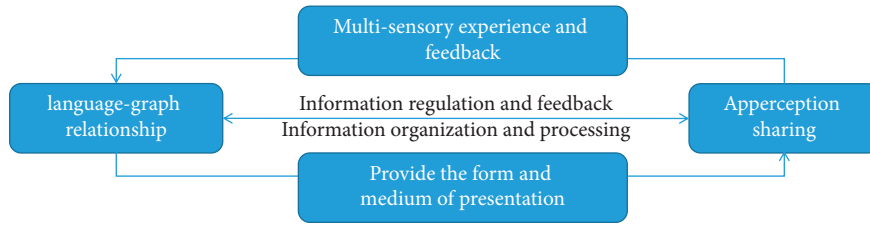
FIGURE 5: Language graph relationship and apperception sharing.
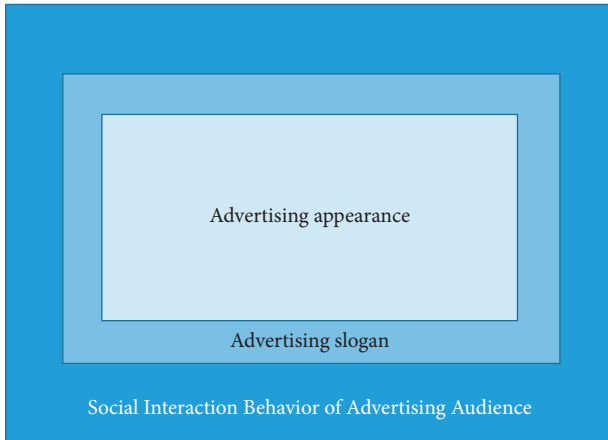
FIGURE 6: Diagram of concentric circle relationship in advertisement.
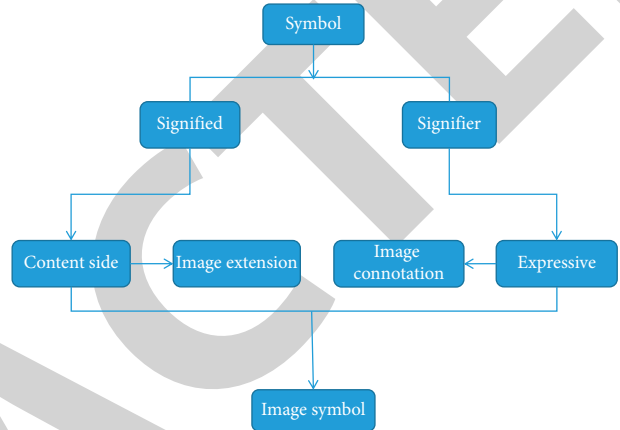
FIGURE 8: New media advertising image from the perspective of semiotics.
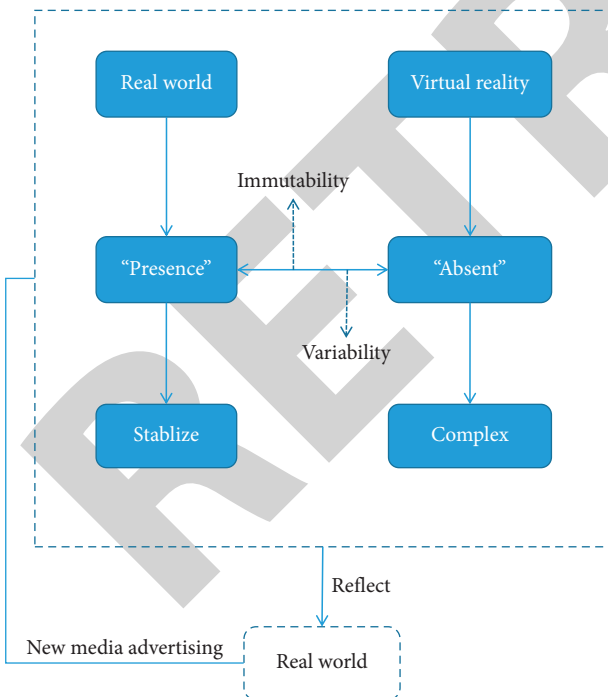
new media advertisement enters the human brain, it will also produce the corresponding image, which is a kind of reconstruction imagination. Taking the new media advertising as a whole, the whole will be like a mirror [14]. There is a similar refraction of life, and these refractions are from people's prior feelings to adapt to this. Images in new media advertisements or the audience's first impression of the target object project corresponding concepts in their minds, and eventually transform into language symbols. See Figure 10.

The language image and image in new media advertisement are two parallel and disjoint "paraphrase chains." However, they can generate new connotations through the interaction of language diagrams and extend countless interactive paraphrase chains. Just like Pierce's triangle relationship, the intricate relationship between multiple images and images generates a complex "network" of new media advertising meanings, which can loop and extend indefinitely [15].

In new media advertising, the tension between the language image and the image fluctuates around the form and effectiveness of the advertisement, which is generally positively correlated. When the tension of the language image increases, the effectiveness of the advertisement also increases [16]. Similarly, when users' multi-senses participate in the cognition of objective things, there is a linear relationship between the effectiveness of advertising and the realization of "apperception sharing." The higher the effectiveness of advertising, the greater the realization of apperception sharing. See Figure 11.

FIGURE 7: New media advertising language image.

3. Research on Learning Adaptability of Technology Support

3.1. The Generation Mechanism of the Internal Meaning of Language Image and Image. After the language image in the
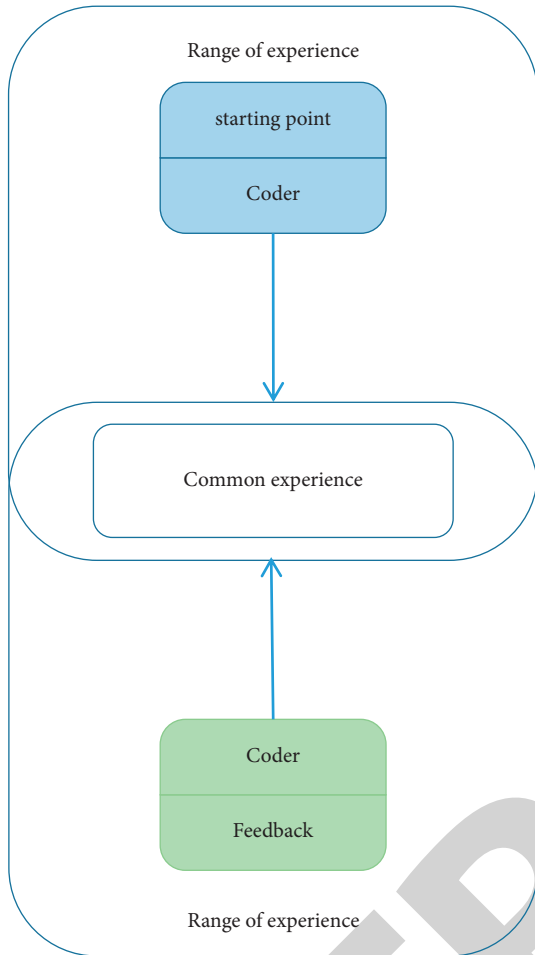
FIGURE 9: Diffusion of shared experience.

FIGURE 10: Symbol chain of language graph transformation.

Secondly, multi-sensory participation helps to maximize the effectiveness of advertising. Taking the above materials as the research object, combined with the secondary data of relevant studies, it is concluded that the stimulation and influence of single sensory participation and multi-sensory participation on people's psychology are different. See Table 2. Data show that advertisements with multi-sensory participation have better effects on the psychological and behavioral aspects of target groups than advertisements with single sensory participation. The standard deviation value proves that rich sensory participation can effectively reduce the deviation degree of people's cognition of advertising information [17].

3.2. The Research Overview of Learning Adaptability of Technology Support Abroad

3.2.1. Time Span Analysis. In the research, the total literature of technology-supported learning adaptability, technology-improved learning adaptability, and technology-environment learning adaptability were analyzed [18]. Among them, the literature on learning adaptability in the technical environment could be further divided into the literature on learning adaptability in the hybrid learning environment

FIGURE 11: Relationship between new media advertising effectiveness and "apperception sharing."

and the literature on learning adaptability in the network learning environment, as shown in Figure 12.

At present, the research on the learning adaptability of technology support in China only includes the research on

Table 2: Comparison of single sense and multi-sense.

	Single sense		Two senses		Three senses	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
Cognition	1.79	0.893	2.39	0.527	3.20	0.483
Mood	1.70	0.810	2.23	0.726	2.36	0.695
Attitude	1.52	0.755	2.09	0.663	3.26	0.645
Memory	1.55	0.617	2.12	0.432	2.55	0.357
Action	1.79	0.927	2.24	0.812	2.29	0.655
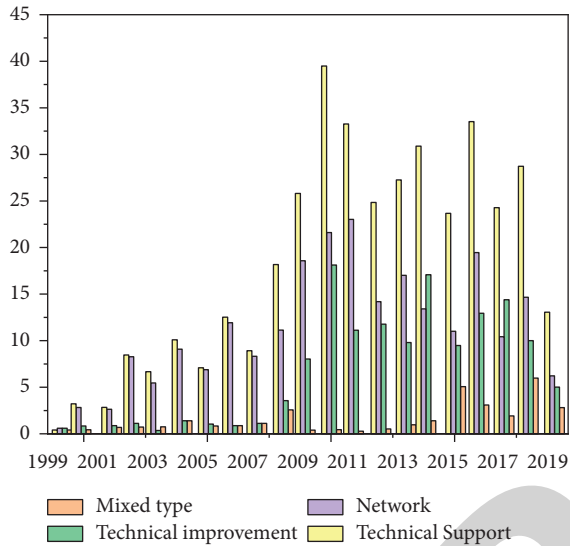
Figure 12: Time distribution of research on learning adaptability of technology support abroad.
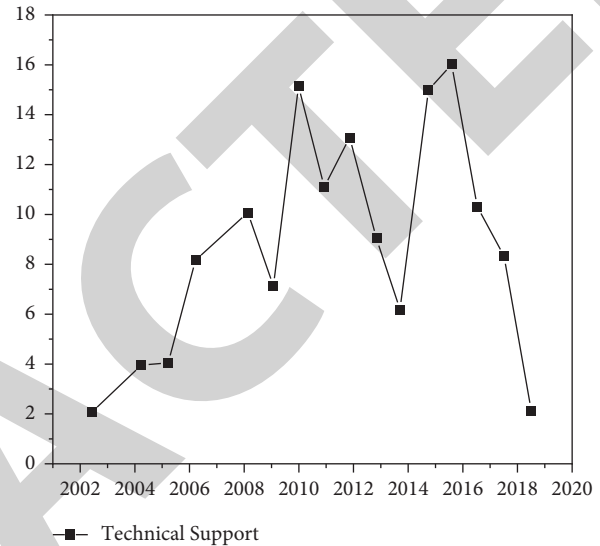
Figure 13: Time distribution of research on learning adaptability of technology support at home.

the learning adaptability under the technology environment (hybrid learning environment and network learning environment). In addition, there are few researches on learning adaptability in mixed learning environment [19]. Therefore, this article combines researches on learning adaptability in network learning environment and hybrid learning environment for analysis, and obtains the time span of research on learning adaptability of technology support at home, as shown in Figure 13.

This article systematically summarizes the research situation of hybrid learning at home and abroad and the research status of the learning adaptability of technology support, obtaining valuable enlightenment and laying a foundation for the follow-up research. Through the summary, specific Revelations are as follows [20]:

(1) Research on hybrid learning at home and abroad presents two important trends. Specifically, the first one is to further study the teaching and learning rules in the hybrid learning environment and to explore new hybrid learning methods, such as MOOC-based hybrid learning. Through in-depth exploration of its teaching and learning rules, teaching activities or modes are designed to improve teaching quality and promote the reform of higher education today [21]. The second one is that the research perspective gradually turns to the micro level exploration,

focusing on how students learn and how to promote students to learn effectively. Among them, learning psychology is an important research topic in the current hybrid learning, mainly involving the psychological characteristics and laws of students in the hybrid learning environment, including learning attitude, learning emotion, cognitive and meta-cognitive laws, learning motivation and self-efficacy, etc. Learning adaptability, as a hot research topic in the field of learning psychology, emphasizes the positive adjustment of students' inner psychology and external behavior, which covers many psychological and behavioral elements in the learning process.

(2) More and more scholars are paying attention to the research of the learning adaptability of technology support. In terms of the research overview of learning adaptability (time distribution, major journals, and important literature), it can be seen that the research on learning adaptability under technology-supported environment began in 1999 and 2004, respectively. The research on the learning adaptability of technology support in China began in 2002 and the research on the learning adaptability of hybrid learning environment began in 2015. The development of foreign research is earlier than domestic research. The overall number of research is

also more than that of domestic research. The research system is relatively more mature. In addition, in terms of research trend, the number of literature both at home and abroad is on the rise, which also indicates that more and more scholars begin to pay attention to the research of the learning adaptability of technology support.

(3) The research of the learning adaptability of technology support includes a wealth of topics. This part mainly expounds the research of learning adaptability under technological environment and the research of technology improving learning adaptability. Firstly, the research of learning adaptability in technological environment, including hybrid learning environment and network learning environment. Through a detailed review of domestic and foreign literature, it is found that there are relatively few researches on learning adaptability in hybrid learning environment at present, which mainly include four topics, namely, research on the status level and countermeasures of learning adaptability, research on influencing factors of learning adaptability, research on the correlation of learning adaptability and research on the intervention of learning adaptability [22].

4. Research on the Development of Higher-Order Thinking and Causal Structure Effect

4.1. Thinking Structure ESEM Exploratory Structure Analysis

4.1.1. Research Methods and Survey. Since the potential relationship structure between observation variables and factors of the designed higher-order thinking structure was not clear in the previous researches, the research adopted the factor analysis method commonly used in capacity structure to reduce the dimensionality of the obtained data and then established the higher-order thinking structure factor model on the basis of determining the potential common factors. In the process of specific research, the SPSS tool was first used to explore the functional advantages of factors. The factor analysis method was used to find common factors between latent variables to achieve the purpose of dimensionality reduction and structure simplification and the preliminary common factor type was obtained. However, this method was subjective and lacked the test of fitting actual data and theoretical model. Therefore, exploratory structural equation modeling (ESEM) was used to explore the factor structure of higher-order thinking flexibly and verify the function and advantage of its factor model systematically, so as to provide a more suitable measurement model for the analysis of the relationship between the latent variables of higher-order thinking structure. In the process of specific factor analysis and extraction, considering the complexity and overall characteristics of higher-order thinking structure as well as the correlation between various factors, the maximum fitting method was chosen, which could generate correlation matrix in the process of factor extraction. For factor rotation, Promax (also known as optimal skew

method) was adopted in the skew axis method, which made the previous relationship of factors well represented and overcame the disadvantage of direct method that the assumed factors were independent and unrelated. In the investigation, a large sample survey and sample test were adopted, which met the requirement of maximum fitting method and skew rotation that samples were more than 200 and normally distributed.

On the basis of field lectures and interviews, stratified random sampling method was adopted in the research. And questionnaires were distributed at four levels, including developed regions, moderately developed cities, county-level cities, and towns. In the process of questionnaire distribution, the method of filling in and collecting the questionnaire in the classroom was adopted. A total of 1565 questionnaires were collected, of which 1505 were valid. The total samples were randomly divided into two types of independent samples, among which 656 samples were subjected to exploratory factor analysis. Male and female students accounted for 44.97% and 55.03% of the questionnaire, respectively. Another 849 samples were analyzed for ESEM and confirmatory factor analysis. Male and female students accounted for 48.4% and 50.5% of the questionnaire, respectively, and the missing value accounted for 1.1%. The male-female ratio, grade, and regional distribution of the two independent samples were basically balanced.

4.1.2. Normal Distribution Test. Normal distribution is the basis of many tests, such as the F test, t test, chi-square test, etc. The independent sample t test and one-way ANOVA used in the research are the t test and F test used. Therefore, it is necessary to test the sample distribution. Sample normality test methods include graphic method, skewness kurtosis test method, and nonparametric test method.

P-P graph, Q-Q graph, and histogram are commonly used in the graphical method, among which the Q-Q graph is more efficient. The Q-Q diagram takes the quantile of the sample as the abscissa, the corresponding points calculated according to the normal distribution as the ordinate, and the sample representation as the scatter point of the cartesian coordinate system. If the data follow a normal distribution, the sample points should be distributed diagonally around the first quadrant.

In the skewness kurtosis test, sample skewness coefficient is $S = B_3/(B_3)^{3/2}$, which is used to test symmetry. When $S > 0$, the distribution is positively skewed. When $S < 0$, the distribution is negatively skewed. Sample kurtosis coefficient is $K = B_3/(B_3)^2 - 3$, which is used to test the kurtosis. $K > 0$ is the peak distribution. $S < 0$ is flat distribution. When $S = 0$, $K = 0$, it is normal distribution. In normal distribution, skewness coefficient and kurtosis coefficient are close to 0. If $S > 3$ and $K > 8$, researchers need to start paying attention. If K exceeds 20, researchers need to pay close attention.

Nonparametric test is a method to use sample data to infer the pattern of population distribution when the population variance is unknown or little known. The nonparametric test method is named "nonparametric" test because it does not involve parameters related to the

population distribution in the inference process. Non-parametric test methods are commonly used W test, goodness of fit test, etc. In the research, skewness kurtosis test was used to test the normality of samples. Most of the absolute values of skewness coefficient and kurtosis coefficient of the samples in the research were less than 1 and very few were less than 2, indicating that the skewness coefficient and kurtosis coefficient were significant. Therefore, the sample of the research basically conformed to the normal distribution. In the research, the skewness coefficient and kurtosis coefficient of the grouped samples involved in the independent sample T test and one-way ANOVA were also calculated by SPSS, both of which were significant.

4.2. Investigation on the Status Quo and Application Potential of Technology-Enriched Classroom Environment. In the part of the survey, the method of random stratification was adopted. The six regions to be investigated were stratified according to their economic development level and educational development level and samples were randomly distributed to schools selected at each level. A total of 880 questionnaires were collected, of which 849 were valid, with an effective rate of 94.67%. The proportion of boys and girls was 48.4% and 50.5%, and the missing value accounted for 1.1%. The technical environment survey of the school found that the technical facilities of the school were more concentrated in the construction of multimedia classroom, computer classroom, and campus website, accounting for 28.0%, 27.2%, and 17.7%, respectively.

4.3. Application Potential Analysis. Based on the overall investigation and comparison of the status quo of technology-supported learning environment, the following conclusions and reflections can be drawn based on the potential of students to adapt to technology-enriched learning environment.

(1) Emerging technologies such as social media promote interactive and rich learning environments. The development of new technology has promoted students' choice of technology. Due to the instantaneity and interactive characteristics of emerging technologies, Wechat and public accounts are sought after by classes, students, and teachers, have and become the most used communication tools among students and teachers. However, the application of QQ and class QQ group has been gradually weakened, and teachers, students, and classes have entered the stage of social media.

(2) Personalized learning and teaching space has become a new feature of technology application. The application of micro-blog, personal website or space, Wechat public account, and other technologies has been widely concerned in classes, teachers, and students. Personalized learning and teaching and the establishment of their own personal learning and teaching space are the current trend of technology application that teachers and students are concerned about and enthusiastic about.

(3) Learning based on integrated resources such as electronic schoolbags has become a new development trend. Electronic backpacks or resource packs have become a hot topic of concern for classes, students, and teachers, especially senior students. The interaction, integration, personalization, learning analysis, and evaluation functions of e-book packages can better promote students' learning, and teachers and students pay more and more attention to them. In addition, with the development of virtual technology and simulation technology, virtual technology began to be concerned in some developed areas, and students began to adapt to and accept the classroom virtual situational teaching.

In conclusion, the integrated attention and application of technology by schools, classes, students, and teachers will promote the application of technology in the classroom environment. The change of educational information construction and concept in schools and the promotion of some experimental projects will also stimulate the construction and investment of technology-enriched classroom environment in schools, and stimulate the potential application of technology by classes, teachers, and students, so as to form a good technology-rich classroom environment atmosphere. The research is innovative in theory, method, and practice. The research results provide a new perspective for higher-order thinking teaching and evaluation under the background of education informatization, and provide a good practical model for optimizing digital resources and environment, and improving students' cognitive level and skill diagnosis, cognitive strategy optimization, and precision teaching intervention. The practical application and improvement of the model will also be the focus of further research.

5. Conclusions

The continuous development of intelligent technology has greatly enriched the information transmission form of new media advertising. In the research, the "newness" of new media advertising was taken as its base, the relationship between language and image in advertising was re-examined, and the internal mechanism of realizing "apperception sharing" in new media advertising was summarized. It not only enriched the relevant theory of advertising language graph relationship but also provided certain reference and guidance for the design practice of new media advertising to some extent. And the development of advertising in the era of new media is changing with each passing day, showing a spiral trend. Tomorrow's new media will no longer be the phenomenon we are familiar with today. The connotation of language image and image will be more and more dynamic and situational, and the boundary between each other is gradually melting. People's sensory function is no longer mainly audio-visual. Multidimensional sensory channels are mobilized and integrated. The overall role of apperception is becoming more and more obvious. Under the support of advanced media technology, unique presentation form, and

comprehensive feedback of people's multiple senses, new media advertising gradually realizes "apperception sharing," which also proves the practical significance of the research.

But because of the limited time and energy, there are still a lot of deficiencies to be improved. For example, in advertising design, not all things can use the data to measure and analyze. The change of people's emotion tends to be very subtle, which is not quantitative. But the research advertising still plays a guiding role in the development of new media. The development of new media is rapid, but the overall research on it is still at a relatively shallow level. The "apperception sharing" of new media advertising needs to be promoted by a large number of practices, and the deep value of language and image also needs to be continuously explored by relevant scholars. The research is expected to provide a beneficial attempt for the research of new media advertising.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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Research Article

The Influence Mechanism of Education on Health from the Sustainable Development Perspective

Hui Hui [ID]

Capital University of Economics and Business, Beijing, China

Correspondence should be addressed to Hui Hui; huihui@cueb.edu.cn

Good health and quality education are two important goals of the Sustainable Development Goals (SDGs). More and more people pay attention to physical and mental health in a pandemic age. Previous studies have paid more attention to the relationship between socioeconomic status and health, and also scholars at home and abroad have not reached a consistent conclusion on how education affects health. In this study, we try to explore the relationship between education and health from the sustainable development perspective and its internal influence mechanism through the data of China General Social Survey (CGSS) in 2015 and 2017, according to Grossman's health demand model. The results indicated that from the junior high school education, physical health improved with the increase of the education level, but this effect was gradually weakened. The relationship between education and mental health is not a simple linear relationship but an inverted U-shaped change. After 16 years of education, mental health gradually decreases. Compared with women and rural population, men and urban population have better health. Education leads to labor market segmentation, which makes people with different education levels in different social structure positions, resulting in differentiation of lifestyles, psychology, and social interaction, and this ultimately leads to health inequality. Education indirectly improves people's health by changing healthy behaviors, cultivating healthy psychology, and strengthening social interactions.

1. Introduction

Since the 21st century, the study of health inequality has been highly concerned by the global community. The World Health Organization (WHO), the World Bank (WB), the United Nations Development Programme (UNDP), and many governments have actively invested in human, material, and financial resources to study health inequality through economic, social, and psychological dimensions in a diverse global background. The influencing factors of health inequality have always been an important part of academic research, mainly including two aspects: social demographic characteristics and socioeconomic status, especially the latter. The health of groups with higher socioeconomic status is usually better than that of groups with lower socioeconomic status [1, 2]. The commonly used socioeconomic status indicators are income, occupation, and education.

Education has a more fundamental role than income and occupation [3–7].

Studies suggest that people with higher education live longer, having a healthier physical and psychological condition, which is called "education gradient in health" emphasized by economics, sociology, psychology, and epidemiology. Previous studies mostly focused on the people of developed countries, and the research conclusions may not be fully applicable to developing countries. Based on this consideration, what is the relationship between education and health in China? If education has a significant impact on health, what is the mechanism behind? Therefore, this study attempts to answer whether education has an impact on people's health through Chinese experience, so as to clarify the influence mechanism of education on health inequality and provide further reference for the government to formulate education and health policies.

2. Literature Review

From the Alma-Ata Declaration of 1978, the United Nations (UN) called on all countries in the world to work together to achieve the goal of "Health for All in 2000." It defines the importance of main health care and delineating governments duties for health. Since then, people's understanding of health has been expanding. The relationship between education and health has been one of the most important topics in western academia, and a large number of empirical research results have been formed.

Winkleby et al. [8] found that education has a close relationship with people's cholesterol content. The people who have higher education got a lower risk of excessive cholesterol. Pappas [9] found that the mortality rate of white males with higher education was significantly lower than the white males without higher education in the same period in the United States in 1960–1986. Ross and Wu [10] found that people with higher education know how to use the healthcare services better, and their self-rated health is better. Ross and Mirowsky [5] found that highly educated people feel more substantial and valuable at work, and their ability to regulate life and health is significantly stronger, which explains why education is the most important factor affecting people's health.

Compared with a large number of literature studies on the relationship between education and physical health, the academic circle has relatively little discussion on the relationship between education and mental health. A small number of studies show that the relationship between education and mental health is also complicated, and there are two completely different views. First, education has a significant positive impact on mental health. Rates of schizophrenia and depression have fallen significantly among highly educated people, both in developed western countries and in less developed regions, such as Latin America. The positive emotions and self-measured mental health factor score of illiterate and primary school education residents were significantly lower than those of high school education or above. Educational achievement can protect individual mental health and reduce mental health risk effectively. Second, education has a significant negative impact on mental health. People with a higher education level have higher self-expectations. Once they encounter difficulties or crises such as unemployment, income, and decline in professional status, it is difficult to realize their self-expectations. They may have a greater sense of pressure and loss, forming negative emotions such as tension, anxiety, and pessimism, leading to a decline in mental health.

In summary, the relationship between education and health at home and abroad has not formed a consistent conclusion yet. The research can be further expanded in China: in the aspect of research object, the previous studies mainly concentrated on the migrant workers, the elderly, and other specific groups, which is lack of a comprehensive discussion of the entire adult group; in terms of content, the previous research focused on the comparative study of groups or regions, and there are few of them on the internal mechanism of education and health in peoples' behaviors

and psychology way. Therefore, this study attempts to comprehensively explore the influence mechanism of education on health from the above two aspects by using the data of China General Social Survey (CGSS).

3. Theory and Hypothesis

In a very broad sense, there are three possible reasons for the link between health and education. One reason is that poor health leads to low levels of education. Another possibility is that increasing education improves health. Lastly, there may be third factors that increase both education and health. It is important for policy to understand how much of the observed correlation between education and health can be explained by each of these explanations. Subsidies for schooling would only be effective in improving the health of the population if, in fact, education causes health.

There are two representative theories in the study of health inequality: one is "resource substitution theory," and the other is "reinforcement of advantage theory" [5]. Resource substitution theory believes that as a social resource, education will promote health more significantly in vulnerable groups. Because this group has disadvantages in social resources, it will be more dependent on rare educational resources, thus benefiting more from educational achievements. Resource substitution theory forecasts people's age, injury levels, and a rise in the poorly educated. According to this theory, the educational impact on health is superior for those whose parents are also educated or that the personal education impact on health is unaffected by parental education. And by this theory, education enhances women's well-being more than men's since women's socioeconomic disadvantage forces them to rely more on education to obtain happiness. This theory would help to understand that personal control, healthy lifestyle, job, and economic situations all facilitate the conditional effect of education on health, and these mediators follow the same conditional pattern as education.

On the contrary, reinforcement of advantage theory argues that the promotion of education to health will cause "Matthew Effect" [5, 11], which means individuals with more social resources will benefit more from educational achievements. The method of influencing behavior through regulating the behavior consequences is known as the reinforcement theory. In this theory, a grouping of rewards would reinforce preferred behavior or eliminate undesirable behavior. Selective perception, selective retention, and selective exposure are the three fundamental mechanisms that reinforce this theory. Reinforcement theorists believe that behavior is influenced by the environment, and instead of interior thoughts, the behaviors are measured by reinforces.

These two theories are supported by empirical data in most western countries. Therefore, based on theoretical analysis, we believe that education has a significant positive impact on individual health. Accordingly, we propose hypothesis 1: people with higher levels of education are healthier.

Education is an important human capital and affects access to economic, psychological, and social resources, which in turn affect people's physical and mental health. First, education affects the promotion of socioeconomic status and the accumulation of material returns. Good education improves individual human capital, which can make people occupy a greater advantage in the labor market competition. There is a greater chance of securing a stable, better-paying job in a better environment, and the material rewards of education contribute to maintaining better physical health. Stable work and good income bring people greater psychological satisfaction and happiness and promote the improvement of their mental health level [12]. Secondly, education enables people to acquire more health knowledge and shape a healthy lifestyle. Education also enhances life planning and controls ability, cultivating optimistic life attitude and constructing positive psychological capital. Educated people are more likely to be physically active regularly, drink moderately, avoid obesity, smoke less, and feel more in control of their lives. These good living habits, scientific lifestyle, and positive life attitude can significantly improve physical and mental health [13]. Finally, educational achievement may influence physical and mental health through social support resources. The higher the level of education, the more medical support they receive, such as regular health check-ups. When health problems arise, better medical support services are available to maintain good health. Generally speaking, well-educated people have strong social communication ability, which is conducive to expanding and maintaining social relations with others [14]. In addition, people can obtain more psychological and emotional support from social networks, strengthening their happy experience and maintaining good mental health status [15]. Based on the above analysis, hypothesis 2 is established: education indirectly affects people's physical and mental health through income, lifestyle, and social interaction.

4. Materials and Methods

4.1. Model Construction.
In order to analyze the correlation between education and health, we use Grossman's [16] health demand model to estimate the following regression:

$$H_i = C + \alpha E_i + \beta X_i + \varepsilon, \tag{1}$$

where H_i is a measure of individual i's physical and mental health, E_i stands for individual i's years of completed education, X_i is a vector of individual characteristics that includes gender, age, and registration place, c is a constant term, and ε is the error term. The coefficient on education α (also referred to as the education gradient) is the object of interest, and it measures the effect of one more year of education on the particular measure of health.

In order to further clarify the relationship between education and health, as well as the influencing factors, based on the baseline model, three possible influencing factors proposed by existing theories are introduced: income, lifestyle, and social interaction. We estimate the regression as follows:

$$H_i = \beta_0 + \beta_1 E_i + \beta_2 X_i + \beta_3 Y_i + \beta_4 E_i \times I_i \\ + \beta_5 E_i \times L_i + \beta_6 E_i \times S_i + \varepsilon, \tag{2}$$

where H_i is a measure of individual i's physical and mental health, E_i stands for individual i's years of completed education, X_i is a vector of individual characteristics, Y_i stands for the influencing factors, such as income, lifestyle, and social interaction. $E_i \times I_i$ is the interaction with education and income; $E_i \times L_i$ is the interaction with education and lifestyle; $E_i \times S_i$ is the interaction with education and social interaction. β_0 is a constant term, and ε is the error term.

4.2. Data and Measurement.
The data we used are from the 2015 and 2017 Chinese General Social Survey (CGSS), which is the first large-scale national, comprehensive, and continuous social survey project in China. The survey covers most provinces and regions in the mainland of China by using the multilevel stratified sampling method. In the survey, since respondents who answered health-related questions were randomly selected, the missing values in this part can be approximately regarded as completely random missing, which can be directly eliminated without further processing. Therefore, the final sample size is 11078.

In the studies of health inequality, the measurements of health include self-rated health, mortality, medical health, and functional health indicators [3]. The dependent variable of this study is physical and mental health. We measure the level of physical health through self-assessment of health. The respondents answered the self-rated health question, "How is your current physical condition?" (1= very unhealthy; 2= relatively unhealthy; 3= general; 4= relatively healthy; 5= very healthy). We treat self-rated health as a binary variable. "very healthy, relatively healthy and fair" is coded as "good health =1." "Very unhealthy and relatively unhealthy" is coded as "Poor health =0." We measure the level of mental health through Hopkins Symptoms Check List (simplified version), which consists of 8 questions. Respondents answered from "no, occasionally, sometimes, and often" and assigned a score of 4 to 1. The principal component method was used for factor analysis of the score, and the formula was used to convert the mental health factor value into 1–100 points. The higher the score, the better the mental health.

The independent variable is the level of education. In order to reflect the nonlinear relationship between education levels [17], the five-classification method is used to divide the level of education into 1= without any education; 2= primary school; 3= junior high school; 4= high school; 5= college and above [18]. The control variable is gender (1= male; 0= female), age, and registration place (1= urban; 0= rural).

In this study, the socioeconomic status was measured by personal annual income (logarithmic conversion). Lifestyle was measured by the frequency of physical exercise (1= daily; 2= several times a week; 3= several times a month; 4= several or less a year; 5= never). Social interaction is measured by the frequency of participation in group activities (1= once a week or more; 2= 1 to 3 times a month; 3= attended several times last year; 4= participated once last year; 5= never

Table 1: Descriptive statistical results.

Variables	Mean Value	Standard Deviation	Min	Max
Self-rated health	0.769	0.422	0	1
Mental health	90.6	12.5	96	39
Level of education	2.957	1.255	1	5
Years of completed education	8.701	4.825	0	19
Gender	0.490	0.500	0	1
Registration place	0.302	0.459	0	1
Age	50.527	16.739	18	103
Personal annual income	8.029	3.884	0	16.111
Physical exercise	3.685	1.553	1	5
Group activities	4.447	1.104	1	5

Table 2: The mechanisms for the relationship between education and physical health.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Years of completed education		0.127***	0.102***	0.103***	0.105***
		(3.83)	(3.48)	(3.65)	(3.23)
Gender	0.128***	0.111***	0.110***	0.129***	0.132***
	(3.82)	(3.74)	(3.64)	(3.01)	(3.19)
Registration place	0.263***	0.224***	0.248**	0.246**	0.250***
	(5.35)	(3.28)	(4.57)	(4.47)	(4.71)
Age	−0.063***	−0.066***	−0.059***	−0.061***	−0.062***
	(−11.22)	(−11.77)	(−11.68)	(−11.65)	(−11.17)
Primary school	0.033				
	(1.34)				
Junior high school	0.122***				
	(4.73)				
High school	0.153***				
	(5.08)				
College and above	0.161***				
	(4.69)				
Personal annual income		0.142***	0.166***		
		(5.85)	(4.58)		
Physical exercise		0.127***		0.152***	
		(5.34)		(4.22)	
Group activities		0.123***			0.180***
		(3.25)			(4.77)
Education × personal income			0.101***		
			(3.80)		
Education × physical exercise				0.107***	
				(3.73)	
Education × group activities					0.114***
					(3.02)
Constant term	0.934***	1.100***	0.848***	1.141***	1.250***
	(24.84)	(21.66)	(18.93)	(21.56)	(17.59)
Sample size	11,078	11,078	11,078	11,078	11,078
R^2	0.119	0.143	0.128	0.129	0.126

[1]The reference group comprises females, rural people, and people without any education. [2]*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

participated). In order to avoid the sample selection bias caused by population mobility and the estimation error caused by the sample size difference, we add interactions in the model in turn, rather than directly comparing the coefficients of the subsample model [19]. The descriptive statistical results of the data are shown in Table 1.

According to Table 1, in the physical health part, residents' self-rated health level is high. In terms of mental health, the average score of residents' mental health was 90.6. As can be seen, the general mental health of the population is relatively good.

5. Empirical Analysis and Results

5.1. Analysis of the Influence Mechanism of Education on Physical Health.
We use the multiple linear regression method to establish the baseline model first, and then put variables into the baseline model in turn: personal income (personal annual income), lifestyle (physical exercise), social interaction (group activities), and their interactions with education. Then, we test the hypotheses 1–2, respectively, and analyze the influencing factors of education on health. The results are shown in Table 2.

Model 1 shows that education has no significant effect on health in primary education. From the junior high school, education has a significant positive effect on health. Compared with primary school people, junior high school, high school, college, and above people reported good health that was increased by 12.98%, 16.53%, and 17.47%. This shows that education and health are linear, rather than the "inverted U" type. That is, from the junior high school, the health becomes better with the improvement of the education level, but the influence of education on health gradually weakens.

In model 2, the regression coefficient of the years of completed education was 0.127, and it was significant at 0.01 level. That means for every additional year of education, health improves by 13.5%. The empirical results are similar to those of foreign studies [10, 19], and they also confirm the theory of learned effectiveness [20] that education is an ability to acquire effectiveness. Comprehensive model 1 and model 2 show that hypothesis 1 is supported.

Control variables also have an important impact on individual health. In terms of gender, the health advantage of men is obvious, and the health status of men is better than that of women by 13.7%, which is consistent with previous studies [21]. In terms of age, there is a significant negative correlation with physical health; that is, with the increase of age, physical health gradually decreased. In terms of urban-rural differences, there are obvious health differences between urban and rural populations. The advantages of urban population in reporting good health are 1.3 times of rural population, indicating that urban residents are better than rural residents in medical services, health environment, and economic development. These factors significantly improve the health level of urban residents, consistent with previous studies [1].

In model 3, the main effect of personal income has a significant positive impact on health after adding the interaction between education and income. The data showed that for each additional unit of the natural logarithm of personal annual income, the health improved by 18%. In model 4, people who often participate in physical exercise have a healthier physical condition. The data show that the frequency of participating in physical exercise increases by one unit, and the health improved by 1.16 times. In model 5, people with frequent social interaction have a healthier physical condition. The data show that under the interaction of education and group activities, the frequency of participating in group activities increases by one unit, and the health improved by 1.12 times.

Comprehensive models 3, 4, and 5, the years of completed education, have a significant role in promoting self-rated health. However, the main effect coefficient of education is reduced to varying degrees after the interactions of education and income, education and physical exercise, and education and group activities are included. This shows that education affects personal health by affecting the personal income level, lifestyle, and social interaction. Therefore, hypothesis 2 was supported.

TABLE 3: The mechanisms for the relationship between education and mental health.

Variables	Model 1	Model 2	Model 3
Years of completed education		0.010***	0.014**
		(4.20)	(2.12)
Gender	0.001	0.014	0.015
	(0.07)	(1.14)	(1.16)
Age	−0.005***	−0.005***	−0.005***
	(−10.30)	(−11.43)	(−10.95)
Registration place	0.060***	0.022	0.017
	(4.03)	(1.47)	(1.12)
Primary school	0.025***		
	(1.17)		
Junior high school	0.144***		
	(5.01)		
High school	0.168***		
	(5.19)		
College and above	0.179***		
	(5.22)		
Personal annual income		0.019***	0.034***
		(6.56)	(5.39)
Physical exercise		0.027***	0.058***
		(6.62)	(4.56)
Group activities		0.014***	0.029***
		(6.33)	(5.02)
Education × personal income			0.002***
			(3.28)
Education × physical exercise			0.003***
			(2.58)
Education × group activities			0.001***
			(3.17)
Constant term	0.987***	1.078***	1.039***
	(25.70)	(24.68)	(13.45)
Sample size	11,078	11,078	11,078
R^2	0.126	0.151	0.156

[1]The reference group comprises females, rural people, and people without any education. [2]*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.2. Analysis of the Influence Mechanism of Education on Mental Health.

Education has a significant effect on mental health (Table 3). After controlling for other variables, Model 1 indicates that the higher the educational level, the better the mental health status. The results of Model 2 show that the relationship between education and mental health is not a simple linear one but an inverted U-shaped curve. With the increase of years of education, the mental health of postgraduates increases first and then decreases. When the years of education reach about 16 years, the mental health of postgraduates gradually decreases. Because the self-expectation level of postgraduates is higher, they are more engaged in administrative management and professional/technical work. They are facing greater work pressure and are easy to form tension and anxiety which will lead to worse mental health. Combined results show that hypothesis 1 is not supported.

Comprehensive model 3, the results showed that income, physical exercise, and community participation all had significant positive effects on mental health. It also suggests that income, physical exercise, and community participation explain part of the difference in the impact of

education on mental health, and these three are important mediating factors of education on mental health. Therefore, hypothesis 2 was supported.

6. Discussion and Conclusions

Previous studies have paid more attention to the relationship between socioeconomic status and health, and scholars at home and abroad have not reached a consistent conclusion on how education affects physical and mental health. This study uses the data of China's General Social Survey (CGSS) to explore the relationship between education and health, and its internal influence mechanism from the sustainable development perspective. The results indicate that education has a significant promoting effect on physical and mental health whether it is measured by education levels or years of completed education. The study found that from the junior high school education, individual's physical health improved with the increase of the education level, but the growth rate gradually slowed down. The relationship between education and mental health is not a simple linear relationship but an inverted U-shaped change. After 16 years of education, mental health gradually decreases. Compared with women and rural population, men and urban population have better health. This result confirms "reinforcement of advantage theory." In the impact mechanism, the analysis confirms that education indirectly improves people's physical and mental health by raising income, changing lifestyle, and strengthening social interaction.

The above results suggest that education not only affects individual material returns but also brings nonmaterial returns. Educational achievement is an important factor affecting health, which means that educational inequality leads to health inequality. The trend of health inequality in western countries also exists in China. This study suggests that education leads to labor market segmentation, which makes people with different education levels in different social structure positions, resulting in differentiation of economic status, lifestyle, and social interaction, and this ultimately leads to health inequality.

For those with lower education level, they are difficult to enter the primary labor market who stay more in the secondary labor market or the agricultural sector, engaging in simple and repetitive productive work. There are more unhealthy factors in their working environment, and they have lower return on work and are limited in health care, healthy lifestyle, and social interaction. This means that the low material return brought by education has a negative impact on health. The people with lower education, due to their own knowledge limitations, may lack healthy lifestyle values. They don't have strong motivation to establish and maintain a healthy lifestyle. Meanwhile, long working hours squeeze their time and opportunities for physical exercise and community participation, making them difficult to develop physical exercise habits and expand formal social interaction. Lack of channels to release stress causes a significant negative impact on their health too.

For those with a higher education level, especially those with a college degree or above, they are more likely to enter the primary labor market, engaging in more free and creative work and having relatively fewer adverse factors for health in the working environment. Also, their income returns are relatively high, which is conducive to creating healthy living conditions and lifestyles (increasing physical exercise). They have relatively stable work and have been easy to bring satisfaction and security to themselves. The reciprocal communication brought by physical exercise and group activity participation helps to release negative emotions in life and work.

Due to the limitation of data, we only use the frequency of physical exercise and group activity participation as indicators to measure people's lifestyles and social interactions which is not enough. Further research is needed to examine other lifestyles (such as smoking, drinking, vacation, physical examination, and diet). In addition, whether the social interaction network scale, structure, and other indicators can become the intermediary mechanism of education affecting health remains to be further analyzed and tested in future research.

Data Availability

Data available in Chinese General Social Survey, CGSS http://cgss.ruc.edu.cn/English/Home.htm.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Research Article

Analysis on the Correspondence between Sustainable Social Service Design and Humanistic Aesthetic Design and Cognitive Psychological Utility

Yang Yu [iD],[1,2] **Jiaji Gao,**[1] **and Nagai Yukari**[2]

[1]*School of Art and Design, Dalian Polytechnic University, Dalian 116034, Liaoning, China*
[2]*School of Knowledge Science, Japan Advanced Institute of Science and Technology, Nomi 923-1292, Ishikawa, Japan*

Correspondence should be addressed to Yang Yu; yuyang@dlpu.edu.cn

In this era of gradual scarcity of resources, sustainable development has become an important issue for society. In this environment, the cultural, economic, and social environment has a decisive influence on sustainable development. This paper mainly starts with service design and humanistic aesthetics and introduces the sustainable design development theory into the design so that the design can better respond to the sustainable development strategy. We established the integration method of marketing and design, through the combination of humanistic art design and the cognitive psychological effect and the cognitive psychological effect of customers, advocating appropriate design and humanism in the information age, which not only improves the sustainable society but also enriches the service design system theory.

1. Introduction

The current society is an important period of turning to a sustainable society, and the environmental, economic, and social issues arising under its specific background undoubtedly make sustainable social services have greater responsibility [1]. However, in the case of sustainable social service design, the corresponding relationship between sustainable social service design, humanistic aesthetic design, and cognitive psychological utility still needs to be discussed in detail [2]. Under the current situation of rapid development of today's society, at present, service design in Asia is relatively few, this idea is mainly popular in Europe, and in particular, the UK will develop relatively better. It is necessary to reflect on the phenomenon of today's social service design. Service design is a design activity that effectively plans and organizes the people, infrastructure, communication, and materials involved in a service to improve the user experience and service quality, which can analyze the drawbacks that will arise from the lack of design ethics in today's society, and Gao Mei from Zhengzhou

University of Light Industry points out the status and responsibility of useless design in changing the way of social development, so as to the emergence of the useless design stage is the inevitable trend of the development of sustainable social service design theory. Among them, "useless design" is a new design concept. Useless design refers to the design of discarded items, excess waste from the manufacturing process, outdated items, etc., through manufacturing or even handcrafting under the condition of environmental protection principles, to transform the second life of the object, promote environmental awareness of using less materials, and emphasize design to create sustainable. It advocates for more direct value for consumers, society, or the world and for the sustainability of design. Professor Liu Xin of Tsinghua University discusses the meaning of the useless design concept and points out the progressive significance of the useless design concept in the new era: more emphasis is placed on the importance of combining humanistic art design with cognitive and psychological utility; it reverses the ethics of today's design, advocates moderate design and humanity in the information

age, pays attention to people's emotional needs, reshapes people's concept of happiness, creates more direct value for society, optimizes "useless" resources, and pays attention to the design of nonmaterial forms [3], while the biggest characteristic of sustainable social service design is the fairness, sustainability, and commonality as the three basic principles [4].

"Sustainable design" is different from the general design that outputs purely material products [5]. It integrates products and services to build sustainable solutions to meet the specific needs of consumers, replacing them with "results" and "benefits." It is a strategic design activity with the ultimate goal of reducing the wastage of resources and environmental pollution and changing the quality of people's social life [6]. It can be seen that sustainable social service design occupies a very important position in our life [7].

In the theory of social service design, the pension service is an indispensable part of it. With the more and more serious national aging, the pension service also needs to be updated. Under the background of China's increasingly obvious aging, smart pension is an inevitable trend of China's pension development [8]. The shrinking social labor force and the substantial growth of the elderly population in the future will completely change China's pension structure [9] and become the driving force for the development of intelligent elderly care. At present, most of the research on smart old-age care centers on technical realization and social system [10]. How to use technology and design to improve the current chaotic old-age service resources, high cost of old-age care, low penetration rate, scattered smart applications, insufficient social resource support, and computer anxiety caused by the use of the Internet and smart products for the elderly, smart community old-age service system issues such as sustainable development, and provide directions for the research and development of smart old-age care. This paper introduces the concept of situational awareness, subdivides the key influencing factors in the elderly care situation, and makes the "wisdom" in smart elderly care truly play its role so that intelligence is not only reflected in the intelligence of equipment and the passive acceptance of the elderly. More attention should be paid to the old-age support for the elderly and the way to guide their behavior, and ultimately achieve the purpose of improving the quality of life and the way [11]. Situational awareness is based on the environment, dynamic, overall insight into the ability of security risk; is based on the security data, from the global perspective of security threat identification, analysis, response disposal of a way, and ultimately for decision and action; and is the security ability of the ground, and it provides certain security for the security of pension services.

The final design strategy is proposed based on user, service, social, and device contexts. We design practice through the application of design strategies to verify its effectiveness and ultimately optimize the user experience and system development of the smart community elderly care service App, in order to contribute to the design research in the field of smart elderly care in China [12]. The specific design strategy is shown in Table 1.

In the design strategy of elderly care services, the psychological problems of the elderly should also be focused on.

Psychological effects are more common psychological phenomena and laws in social life; it is the causal reaction or chain reaction that the behavior or role of a certain character or thing causes corresponding changes in other characters or things. Like anything, it has both positive and negative meanings. Therefore, correctly understanding, understanding, mastering, and utilizing the psychological effect play very important roles and significance in people's daily life and work. Cognitive psychological utility is mainly reflected in the "customer perceived value."

Products used for consumption mainly refer to material commodities, spiritual and cultural commodities, various labor services, and other intangible and nonmaterial commodities. Features are associated with value, and product value should be analyzed under specific issues [13]. The value must be measured in conjunction with the specific environment, and the value in different environments should be very different.

2. State of the Art

Value thinking is a rational way of thinking to deeply understand the needs of products or consumers. Businesses grow by providing value to customers and gaining self-interest through their products [14]. Porter believes that a company's competitive advantage is ultimately derived from the value a company can create for customers. With the development of enterprise management theory, the competitive advantage of enterprises has shifted from product and technology as the core to the customer as the core, and the customer's satisfaction and loyalty are deeply studied. Robert F. Lauterborm tried to go beyond the 4P theory. 4P marketing theory is summed down to a combination of four basic strategies, namely, product (Product), price (Price), promotion (Promotion), and channel (Place). Since the English characters of these four words are P, plus strategy (Strategy), they are referred to as "4P." He constructed the theory of integrated marketing communication and proposed "4C marketing," as shown in Figure 1.

This theory emphasizes the primacy of customer satisfaction, reduces customer costs as much as possible, and takes into account the convenience of customers' purchasing behavior process, and the management of sales channels should be customer-centric. His theory attempts to emphasize the element theory of repositioning marketing from the customer's perspective, which is different from the 4P theory [15]. It emphasizes that enterprises should first put the pursuit of customer satisfaction in the first place, strive to reduce the purchase cost of customers, and then fully pay attention to the convenience of customers in the purchase process, rather than determine the sales channel strategy from the perspective of the enterprise, and finally, effective marketing communications should also be implemented with consumers at the center [16].

The higher the customer value of the enterprise services, the higher the satisfaction, and the stronger the

TABLE 1: Design strategies.

Design strategy	For elderly care scenarios, we propose strategies based on user contexts, including progressive quality of life contexts to guide users' healthy and life, and integration of multiple contexts to provide users with personalized experience.
	Aiming at the improvement of the experience and adaptability of the elderly in the process of using the App, a strategy of intervening pension assistants to form three types of auxiliary modes based on social context is proposed, and a multi-user human-machine collaboration based on implicit interaction is proposed in the service context and working mode, including strategies for enhancing the perception ability of the elderly in the form of multisensory interaction in the context of equipment.
	We analyze the limitations and problems in the current pension model and pension service system, and propose strategies to improve users' perceived service quality based on service contexts, as well as strategies to enhance social participation in social contexts and make the system sustainable.

FIGURE 1: 4C marketing.

FIGURE 2: Explanation of peripheral value organization problems with customer information centers.

competitiveness of the enterprise. Customer value can be evaluated from three aspects: economic value (the cost value invested in realizing the goal), physical value (the practical application function value obtained by the customer), and psychological value (the satisfaction of the customer's psychological value). Its core research is the difference between the benefits and the costs (purchasing costs and postpurchase costs) that customers get from purchasing goods. The subjective consideration of the customer's consumption process is based on perception, so the customer's perceived value affects the customer's consumption behavior to a large extent. Customer value is a trade-off between the buyer's perceived product performance and the total cost of purchase. Therefore, Zeithaml (V.A.) proposed customer perceived value (CPV). His theory revolves around customers (people) as the main body of marketing and believes that customers will subjectively pay for products and services when they obtain products and services [17]. The cost is weighed against the perceived benefit, and a series of evaluations and feedback are made. Therefore, the customer-perceived value theory points to the trade-off between the benefits that people perceive subjectively and the costs they pay when consuming or obtaining services, and to evaluate the overall utility of products or services [18]. It further guides the customer value problem to the customer's own decision making, thus making it clear that the external value organization problem should be explained from the perspective of the customer information center, as shown in Figure 2.

Over the years of development, it can be classified into three logical perspectives (as shown in Table 2): "trade-off" logic, "level" logic, and "dimension" logic. The trade-off logic interprets customer-perceived value as the contrast between what customers can perceive and what they can perceive; the value hierarchy distinguishes the relationship between internal and external customer values; the value dimension deconstructs the multiplicity of value characteristics [19], a classification method. These three logics are not exclusive, but complement each other and analyze customer value from different perspectives (relevant information is shown in Table 2).

At the level of theoretical sorting, which is shown in Table 3, this paper summarizes "customer perceived value" into three theoretical entry points: trade-off logic, hierarchical logic, and dimension logic, so as to deepen the specific principal content of customer perceived value, in order to understand the rational and irrational customers at the cognitive behavior level and provide the basis for decision making. Furthermore, this paper combines the psychological theories, behavioral theories, social, and cultural theories related to customer perception and other theoretical demonstrations to construct a design clue from value, meaning to specific information carrier [20]. At the level of research perspective, this paper emphasizes establishing the perspective of the overall value relationship between customers, designers, enterprises, and products, so as to grasp the

Table 2: Analysis of customer value from different angles.

"Trade-off" logic	"Level" logic	"Dimension" logic
The core of the trade-off logic is a comparison relationship. Think of customer value as a comparison is between total benefits and total costs for customers. It is believed that customers are always inclined to obtain more benefits from them, so as to obtain customer satisfaction. Analysis under this logic is often macroscopic, and at the same time, it is easy to ignore nonsubstantial and measurable content such as perceptual factors.	Hierarchical logic is based on customer needs and is gradually stratified from the core to the appearance based on the customer's value purpose. It regards customer transaction process as a dynamic theory that is embedded in specific scenarios. He believes that customers' "expectation, perception, evaluation, and satisfaction" are based on their value goals. He goes beyond the category of the product itself and puts the customer into a behavioral process, combining the user"s experience in the context to understand the value connotation of the customer.	Dimension (or system) logic emphasizes different aspects of customer perceived value, deeply analyzes the specific perceived gains and losses of customers, and systematically subdivides customer value. This study allows researchers to distinguish between primary and secondary values and to identify the associated relationships. According to different dimensions of customer value, enterprises can adopt different innovative development strategies to meet specific customer needs in terms of product value. Because of the specific analysis of system logic, it will face a variety of possibilities, so there are many research cases under this logic, each with its own emphasis.

Table 3: Theoretical review.

Theoretical entry point	Theoretical argument
Logic of trade-offs	Psychological theory
Hierarchical logic	Behavioral theory
Dimensional logic	Sociocultural theory

accurate design direction. On the one hand, the research takes "achieving customer satisfaction" as the core of product design breakthrough, emphasizing the "attraction" factor for customers in the market, flow interacts. This way of thinking is to place product goals in the value network and design with the logic of customer service.

3. Missing Customer Value in Design Work

At the level of strategy analysis, based on the analysis of customer perceived value, this paper demonstrates the relationship, elements, and key operation links of strategies. The system construction includes an organic design strategy of four core work links of "value identification," "value path," "value creation," and "value realization." It is characterized by taking customer perceived value as the guide, taking customer value analysis as the starting point for value opportunity exploration, and combining with customer mental model as the basis, the designer's value coding, and customer decoding as the core creation process [21]. We design problem solving in the interaction of scenes. At the end of this paper, the author describes the design practice process based on the product design strategy of customer perceived value. Its focus is to integrate customer value opportunity mining and product form meaning construction to achieve product value breakthroughs.

One of the important reasons why product design innovation brings market risks to enterprises is the lack of in-depth understanding of "customer value." Generally speaking, the aesthetic objects of design aesthetics include at least four levels: form aesthetics, functional aesthetics, technological aesthetics, and cultural aesthetics. In recent years, with the deepening of design culture and concepts, elements related to human care such as natural ecology, social ecology, and social culture have become more and more important, and aesthetics has gradually penetrated into all aspects of human culture. Humanistic aesthetic design means that the design is full of humanistic care.

4. Application and Strategy Analysis of Service Design Value Added and Cognitive Psychology

The inherent "needs are satisfied one by one" design thinking has been difficult to adapt to the current market characteristics in today's era, often resulting in a lack of product competitiveness. Therefore, it is urgent to establish a "value added" that starts from the customer's mind and actively creates market opportunities. *Design Thinking*. Different from the traditional single design method based on engineering management, aesthetics, ergonomics, or psychology, this paper establishes a multidisciplinary knowledge interdisciplinary research method that combines marketing and design and is verified by psychological experiments. The proposed product design strategy research oriented to "customer: perceived value" is precisely in the context of diverse social cultures, guided by the deep customer perceivable value purpose, and "value added" as the breakthrough point, so as to carry out product design. Process is a design strategy that emphasizes utility, process, and system.

4.1. Design Decisions. Cognitive psychology believes that sensation refers to the initial processes of perceiving and encoding environmental energy; perception (also translated as perception) is composed of meaning, relationship, context, judgment, past experience, and the result of the mental processes in which memory comes into play. Cognition is the process of mental activity that integrates, interprets, and assigns meaning to the information obtained by the sense organs. When the designer faces the design task, the external
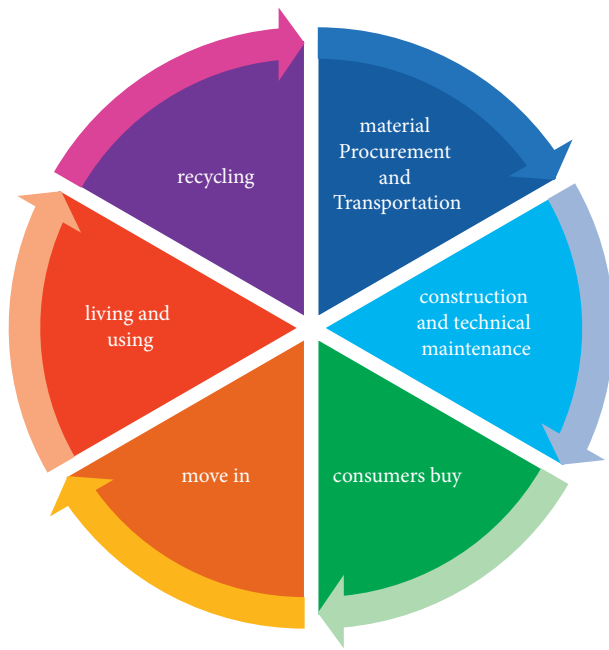
FIGURE 3: Sustainable design process.

and internal constraints are transformed into specific information and memory labels that can be understood, and the long-term memory and knowledge of the designer are retrieved for analysis, integration, evaluation, and decision making. This specific information is influenced by the experience formed by the memory code, which in turn helps the designer make decisions and judgments. The design behavior of the product is the value encoding (Encode) in the open environment, and the process of consumption and use of the product is the user's understanding and decoding (Decode) of the product information, as shown in Figure 3. These works do not stop at the specific artifact design, but focus on the development of theoretical method models and design tools that are instructive for design decision making and innovation processes toolkit.

The design innovation of the intelligent creative industry involves the integration and innovation of a series of elements such as products, spaces, and services. In order to let the design practitioners in the industry systematically master the different aspects of product and service design, the design and R&D team have applied it from architecture, user insights, role research, design scope definition, and feasibility analysis, to prototype testing, conceptual solutions, and design ideas. Research methods and tools develop a design innovation tool package for the field of intelligent building assembly industry, helping designers in this field to build a whole industry chain and a full-use sustainable design innovation toolkit.

Empathy generally refers to the psychological empathy. That is, we put yourself in the shoes of other emotions and emotions of the cognitive perception, grasp, and understanding. Empathy can be divided into four dimensions: perspective taking, empathic concern, fantasy, and personal distress. Psychological empathy is the psychological basis for embodying "value resonance" and an

important theoretical basis and method for design thinking. Value resonance is the synchronization of perception and emotion between the subject and the object of the design, forming a state of mutual understanding. Designers need to achieve this state in order to meet specific social and human needs in the design of artificial objects. Achieving this "resonance" requires designers to study several key elements: discerning object values; in-depth understanding of mental models; coding of specific design information; and meaning construction in specific scenarios. The key point of delivering user value is that the communication and perception of design information can be synchronized in the different contexts of users and designers.

4.1.1. Case 1. Ford Motor Company, with the help of psychological empathy theory, designed and developed "aging simulation clothes" by integrating multidisciplinary experts such as geriatrics, materials science, design science, and behavioral science when designing FOCUS vehicles. Wearing this set of "simulation clothes," designers can personally experience various difficulties encountered by the elderly in cognition, function, behavior, and psychology, and then help the design team to understand the needs of elderly users more comprehensively and design more inclusive FOCUS cars. Once the car was launched, it was favored by both the elderly and the young, achieved huge market success, and became a successful case of empathy theory in inclusive design practice.

4.1.2. Case 2. Interdisciplinary design team jointly established by the British National Medical Service, the Royal College of Art, and Imperial College, through empathy experience, immersive research, tracking, shooting, and observation. The problem is analyzed. Designers work with first responders, observe, interview, and learn from first responders in the ambulance. With this immersive empathy research method (empathy) and codesign process (codesign), humanized design solutions are completed. The new protocol designs a central stretcher in such a way that clinicians have 360-degree access to patients for safer and more effective treatment. The interior design avoids nooks and crannies where dust could accumulate, and all equipment and consumables are secured to one side of the vehicle via a simple and well-designed "work wall" for ergonomically placed medical materials and tools. Emergency teams place modular treatment packs into the vehicle before each shift, containing all the materials needed for a specific job, such as dressings, intubation, airway and oxygen kits, burns, and maternity kits, for precision care. The study found that the newly designed ambulance had clear advantages in treatment efficiency and infection control. According to the forecast of the financial model, the new design can save the UK about 40 million pounds of financial investment in emergency treatment, showing the contribution of psychological empathy at the design strategy level.

4.2. Middle-Level Psychology Research and Application. The second level of psychology is the study of information processing. Cognitive psychology believes that human is an information processing system of "symbol manipulation," which has six functions:

These functions of humans are close to those of computers, as can be seen in Figure 4. According to the theoretical assumptions of cognitive psychology, any system can exhibit intelligence if it can perform the above six functions. Therefore, these six functions also constitute the theoretical basis of artificial intelligence. Semiotics attempts to describe the mechanisms of perception and representation, and is one of the important theoretical frameworks for design psychology research and practice. Among them, perceptual meaning refers to understanding users' activities and needs, while representation refers to transferring users' needs to product attributes. Through visual product attributes and possession and use of products, users construct meaning interpretation codes in specific social contexts and form interpretations of symbols.

4.3. Behavioral Guidance. The product must closely link the visual form with the meaning that can be understood and used, so as to guide people to correct operational behavior. The functional effectiveness of user actions, that is, usability and ease of use, is fundamental criterion for product design. The product should adapt to the human mental model at all times, reducing errors and difficulty of action in use. Norman points out that a product's visual structure helps users evaluate how a product should be used through three clues: ease of use, functional visibility, constraints, and mapping.

The bottom layer of psychology is to study the physiological process of human beings, that is, the emotional experience generated by the neural response process. Norman analyzed people's emotional elements according to the instinct level, behavior level, and spiritual level. He emphasized the emotional applicability and experience of design, and positive user experience must satisfy users' desires and attract them in order to help companies improve their competitive effectiveness, as shown in Figure 5.

4.4. Emotional Intervention. Humanized design can actively intervene and reshape people's psychology and emotions. From a psychological perspective, Csikszentmihalyi and Rochberg-Halton distinguish three modes of interaction between people and things (intuition, emotion, and cognition) that are important for experience, self-perception, and the meaning-making of products. Cognitive models can assess the nature of user-artificial world interactions. Aesthetic experience, as a way of trading psychological cognition, is not limited to the artifact itself, but is considered to be an underlying factor in all user experiences. Emotional patterns of transactions between users and artefacts relate to the way psychic energy is conducted. The experience flow is stimulated by the intrinsic rewards of trading with artificial objects, which in turn leads to positive feedback in the user's
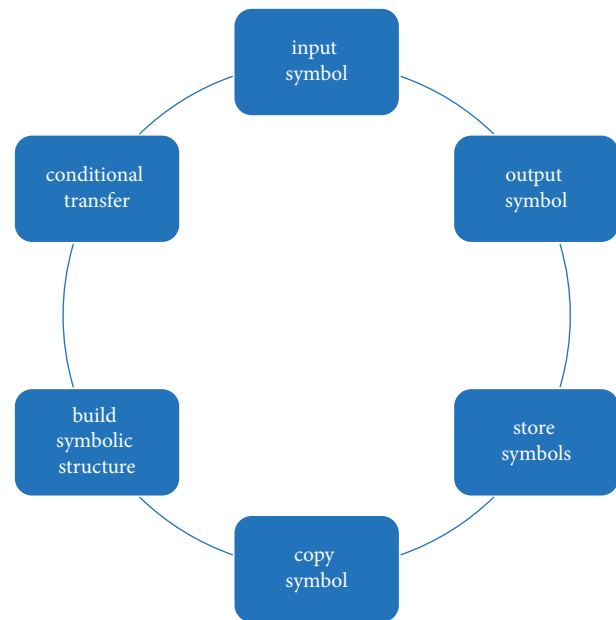
Figure 4: The six functions of the "symbol operation" information processing system.

psychology and helps to reshape self-awareness and emotions.

With a flexible and variable back wing design that can be closed or opened, the modular smart car seat is designed to create a ride experience that promotes the emotional exchange of adjacent occupants while maintaining individual occupant privacy. The dynamic wingspan of the "partner seat" maximizes the occupant's need for human interaction and privacy, and the exterior of the vehicle is designed as a "bubble" of smart glass, with the help of transparent OLEDs on the glass. The emotional information of each passenger is displayed inside.

With the help of experimental tests, oral records, semantic analysis, and other methods, the design team conducts sampling and comparative research on factors such as color psychology and auditory cognition of prisoners, and explores the positive correction effects of color and sound on criminal behavior and criminal psychology. Finally, through the integration of interaction design, color design, sound design, and other elements, the interactive product design and service experience for the psychological correction of prisoners are developed. In the specially designed correctional room in the prison, the prisoners can actively intervene and treat their negative criminal psychology by interacting with the device to help them return to society as soon as possible.

Affected children are still growing, and psychological cognition, socioemotional, and motor development are important to them. The design of the Dutch Children's Oncology Medical Center takes into account the physical and psychological growth needs of sick children, and adopts a large number of bright colors and game-based situational design specially designed for children to guide children's positive emotions, eliminate the fear of seeking medical

The functional attributes of the product perceived by the user determine the objectivity of how the product should be used

The behavior of a specific activity is limited by the user's psychological perception

Mapping refers to the relationship between user operations and the corresponding behavior of the system, which can be understood as the consistency of the perceptibility of the design and the mental model

FIGURE 5: Research and application of bottom-level psychology.

treatment, and improve the quality of life. We give them a more positive therapeutic mindset.

According to statistics, nearly 80% of pediatric patients in hospitals need to take sedatives for MRI examinations. When Philips designed the children's MRI equipment and testing space, with the help of experience design and service design methods, the MRI machine was transformed into a children's experience situation of adventure stories, in which the patient played the protagonist. With the help of multimedia projection technology, the design team constructed different game scenarios, such as underwater exploration, on the outside of the machine and in the room, and created a story script for the technicians to guide the child patients into the story characters. Through the design, the children regard the medical examination, which has always been regarded as serious and terrifying, as a game, and actively cooperate with the medical examination procedure with a more active and pleasant attitude. With the help of this emotional experience design, the number of children taking sedatives dropped to 10%. The design of many children's hospitals not only solves children's fear of hospitals and the troubles of parents but also creates a cultural and artistic healing environment, which has played a positive role in promoting rehabilitation from the perspective of design psychology.

4.5. Value Association. The process of people accepting the meaning of information is the interpretation of the denotation and connotation information of man-made objects. In denotation, the product needs to convey information about its function and the content it represents; connotation refers to the dimension of aesthetic value, which conveys people's subjective impressions and emotions about the product. People like familiar things, and familiarity provides psychological pleasure and security. Associative design should pay attention to a mental model that conforms to the familiarity and intelligibility of a specific group in a cultural context, thereby increasing the user's perception dimension and the density of information and energy transmission. People interact with "real" felt products and their meanings through psychological cognition and associative processes, thereby shaping the user's experience.

5. Conclusion

To sum up, this article breaks through the traditional single design method based on engineering management, aesthetics, human-machine, or psychology, and establishes a multidisciplinary knowledge cross-type research that integrates marketing and design and is verified by psychological experiments. The proposed product design strategy research oriented to "customer perceived value" is precisely in the context of diverse social cultures, guided by the deep customer perceivable value purpose, and "value added" as the breakthrough point, so as to carry out the product design process. A design strategy emphasizes utility, process, and system, to explore the corresponding relationship between sustainable social service design, humanistic aesthetic design, and cognitive psychological utility.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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Research Article

Socio-Emotional Wealth, Innovation Environment, and Innovative Investment Path of Family Enterprises: Implications for Environmental Accountability

Hui Liu (iD)

Huzhou Vocational and Technical College, Huzhou 313000, China

Correspondence should be addressed to Hui Liu; 2017031@huvtc.edu.cn

Driven by social development, family enterprises continue to grow in terms of scale and number, becoming an important force that promotes China's economic development, and how to achieve the healthy growth of family enterprises has become an inevitable topic. With the increasingly fierce market competition, more and more family businesses have changed from a single market model to cross-industry operation, trying to seek new growth points through industry diversification. Multiculturalism is the product of a particular era, and it is closely related to the great changes in society in a specific era, including new changes in the fields of family, marriage, religion, education, and race relations and even to the international context. Multiculturalism is a theoretical response to these changes and represents the current cultural research tendencies of the international academic community. Socio-emotional wealth and an innovative environment are particularly important for family businesses in a multicultural context. The article first introduces the social emotional wealth and the innovation investment of family enterprises, then focuses on the impact of the innovation environment on the innovation investment of family enterprises, and analyzes the influence mechanism of social emotional wealth and innovation environment on family innovation investment, so as to put forward corresponding countermeasures and suggestions, which also has certain guiding significance for the innovation management and practice of Chinese family enterprises.

1. Introduction

In the past, the development of traditional family enterprises only paid attention to the economic development of the enterprise, but ignored the responsibility of family enterprise management to the natural environment. Today's family businesses recognize that economic development is built on environmental sustainability. Therefore, family enterprises now focus on the construction of environmental protection, energy saving, and sustainable development of the enterprise construction. So, this article for environmental responsibility is inspired by the essence of the world.

Multiculturalism refers to the fact that in the case of increasingly complex human society and more developed information circulation, the renewal and transformation of culture are also accelerating, the development of various cultures is facing different opportunities and challenges, and new cultures will emerge in an endless stream. Under the modern complex social structure, we inevitably need a variety of different cultures to serve the development of society, and these cultures serve the development of society, which creates cultural pluralism, that is, multiculturalism in a complex social context.

Innovation is an important measure for enterprises to cultivate sustainable competitive advantages, which is of great significance for the sustainable growth and prosperity of enterprises. With the continuous advancement of innovation-driven development strategy and "double creation" strategy, the position of innovation in enterprise development strategy has become increasingly prominent, and the enthusiasm for innovation in the market has reached an unprecedented height. However, family

businesses, as an important force in maintaining China's rapid economic growth, generally have the problem of insufficient investment in innovation [1]. Therefore, the exploration of the innovation investment orientation of family enterprises has become a hot topic of academic attention. Drawing on the research of previous scholars and combining it with the content to be studied, this paper defines a family enterprise as follows: (1) the actual controller of the enterprise is a natural person or family; (2) the actual controller directly or indirectly holds the shares of the enterprise and is the largest shareholder of the enterprise.

The existing literature mainly explores the motivation of family enterprise innovation investment from the perspective of resource basis theory, agency theory, and housekeeper theory. However, traditional economic theory is not fully applicable to the study of family business management, and it is easy to contradict theory and practice [2]. In 2007, Frezatti et al. first proposed a theory unique to the field of family business, social emotional wealth [3]. The theory holds that in addition to economic goals, families tend to attach great importance to the protection and development of noneconomic goals such as family control, social relations, and intergenerational inheritance. Since the theory of social emotional wealth was proposed, it has gradually become an important direction to explore the driving force of innovative investment in family enterprises based on this theoretical perspective. The profit and loss of social emotional wealth are an important decision point for family businesses to increase investment in innovation. For example, Radke believe that family businesses will show a tendency to risk aversion in order to protect social emotional wealth, thereby reducing investment in innovation [4]. In addition, Yan Ruosen and Xiao Sha found that family businesses reduce innovation investment in order to maintain close social relations and avoid loss of social and emotional wealth [5]. However, some studies have shown that protecting social emotional wealth does not always reduce the intensity of innovation investment in family businesses. Family businesses will increase their investment in innovation in order to preserve and perpetuate their socio-emotional wealth [6].

What is the impact of family protection of social emotional wealth on the innovation investment of family enterprises? Although previous literature has emphasized the importance of family motivation for protecting social emotional wealth in the decision-making of enterprise innovation investment, the influence mechanism of social emotional wealth on the innovation investment of family enterprises has been less deeply revealed and verified. At the same time, social emotional wealth is a multidimensional concept, and most of the existing literature does not subdivide it, thus ignoring the differences in the impact of different dimensions of social emotional wealth on the investment of enterprise innovation. Therefore, this paper will further refine the social emotional wealth and explore the differentiated characteristics and direct effects of its various dimensions on the innovation investment of family enterprises. This research is conducive to further expanding and enriching the research results of family enterprise innovation and also has certain guiding significance for the innovation management and practice of Chinese family enterprises.

2. Social Emotional Wealth and Family Business Innovation Investment

2.1. Social and Emotional Wealth

2.1.1. The Meaning of Social Emotional Wealth. Social emotional wealth comes from Louis A. Thompson, dean of Arizona State University's Business School. In a 2007 study of the decision-making behavior of more than 1,200 family businesses in Spain, Gomez-Mejia proposed that family businesses have intangible wealth, that is, social emotional wealth (SEW), in addition to economic wealth [7].

As shown in Figure 1, social emotional wealth is the most differentiating factor between family business and other forms of organization. Essential characteristics refer to the noneconomic benefits that families receive from family businesses by virtue of their status as owners, decision makers, and managers. This noneconomic interest covers a wide range of issues, including family control over business, family members' identification with business, close social ties, emotional attachment between family members, and intergenerational family inheritance [8], as seen in Figure 2. When strategic decisions have the potential to threaten a family's existing social emotional wealth, they are motivated by an aversion to the loss of socially affective wealth. Family decision makers will avoid adopting this strategy. Therefore, many scholars have also pointed out that the attitude of family businesses to R&D and innovation activities will be affected by the family's pursuit of social emotional wealth.

2.1.2. Social and Emotional Wealth and Innovative Investment in Family Businesses. First, the family's quest for corporate control limits the R&D and innovation activities of the family business. Maintaining family control over the business is often seen as central to the emotional wealth of society. On the one hand, domestic family businesses have long had traditional "home culture" influence, and family control has also received more attention from the family. On the other hand, other dimensions of socio-emotional wealth also need to rely on family control over the business to be realized. For example, leaders who value family obligations often provide family businesses to family members indiscriminately. Family provides employment opportunities through family business resources and provides better working and living conditions for family members. And only by gaining a high degree of control over the enterprise can these benefits be obtained without hindrance. The more a family places control over a business, the more cautious it will be about investing in innovative activities. On the one hand, external funding from innovation and R&D activities can weaken family control over business ownership. R&D activities often require large and ongoing capital investments, and the addition of external investors dilutes the

FIGURE 1: Distribution of the world's top 100 oldest family businesses.

FIGURE 2: Age distribution of family business leaders.

to proceed smoothly, it has corporate control and management. The whole family tends to avoid the risks of intergenerational succession. At that time, most of the senior managers in the enterprise are prone to distrust the second-generation successor, making it difficult for the second generation to show its influence on the enterprise [9]. At that time, the second generation tends to pay more attention to the current interests and short-term performance of the enterprise, expecting to make certain achievements and establish their authority in the short term. R&D itself is long-term and highly uncertain, so family businesses try to avoid such uncertainties.

In addition, the pursuit of social ties, especially political relations, by family-owned enterprises can sometimes be a factor in reducing their innovative R&D activities. Because family businesses establish political ties, they are more likely to obtain the protection of local policies, and even if they do not carry out innovative activities, they can maintain a high market share, thereby weakening the stimulating effect of market competition on the innovation of family enterprises. Moreover, when firms reap lucrative returns through political connections, they tend to squeeze investment in other areas, especially in innovation and R&D, and inject resources into maintaining political ties. The research is conducive to further expanding and enriching the research results of family enterprise innovation and also has certain guiding significance for the innovation management and practice of Chinese family enterprises.

2.2. Family Businesses

2.2.1. The Meaning, Advantages, and Disadvantages of Family Business. American scholar Gersick has made ownership a watershed between family businesses and nonfamily businesses. Donckels and Frohlich propose that only businesses with more than 60% ownership by family members can be called family businesses. Some scholars believe that family management control is the essence of family business; that is, a family or multiple families with close ties directly or indirectly control the operation of a certain enterprise. Some scholars also consider various aspects of ownership and operational control. For example, the American scholar Chandler defined a family business in his masterpiece "The Visible Hand" in 1987 as follows: the founder and its closest partners (and family members) have always held a majority of the equity, they have strong ties with managers, and they retain management decision-making power. Pan Bisheng regards family ownership as a necessary condition and distinguishes between different stages of development of family businesses by the degree of ownership of management rights. Based on the characteristics of intergenerational inheritance, some scholars believe that "passability" is the key to defining family businesses. When defining what a family business is, Yin Zuoliang and others deliberately emphasize the legal inheritance of corporate ownership, control, and residual claims within the family. A company is a family business when family members own a majority stake, participate in management,

family's control over the business and makes new claims for the strategy, use of funds, and day-to-day management of the business. On the other hand, innovation and R&D activities often require talents with specialized knowledge and advanced skills, and the addition of these talents may also threaten the family's actual management control of the enterprise. Introducing professional talents often increases the organizational structure and management of the authorization requirements, thereby reducing the family's management control over the corresponding R&D departments and technical departments. Therefore, when the family pursues a high degree of control over the enterprise, in order to maintain its ownership and management of the family business, it will avoid risks and try to avoid obtaining external funds or appointing family members as important managers in the long term. These factors also limit the investment of enterprises in innovation and R&D activities.

Second, in the process of intergenerational succession, especially in the early stages of the succession process, the willingness of family companies to carry out innovative R&D activities is also weakened. In order for the inheritance

form part of a board of directors, and wish to pass the company on to future generations.

The private economy of family enterprises is an important part of China's nonpublic economy, and private enterprises provide important support for the rapid development of China's economy [10]. As the owners of family businesses, family members participate in business management. On the one hand, this can reduce the separation of powers and alleviate agency problems. On the other hand, family members will show a tendency to avoid risks when making decisions out of the protection of family wealth and may reject valuable projects when faced with risky or uncertain opportunities. The participation of family members in business management is a "double-edged sword," which not only can have a positive impact on the family business, but also may lead to the family business becoming self-contained, as seen in Table 1.

A typical feature of a family business is the high level of involvement of family members in the management of the business [11]. As a group closely related to the interests of the enterprise, family members participate in corporate governance to a higher extent. On the one hand, they can reduce the problem of agency in corporate governance, but on the other hand, because family managers are inferior to professional managers in terms of management knowledge and management experience, there are more concerns about the management process, as they may make some conservative decisions that are not conducive to the development of enterprises.

The advantage of family members managing the enterprise is to have a better understanding of the enterprise and to alleviate the agency problems caused by the separation of the two powers of the enterprise, thus promoting the business performance of the enterprise. For small- and medium-sized family enterprises, family management can reduce agency costs and improve execution efficiency, thereby having a positive impact on the value of enterprises. When enterprises are in an industry with fierce competition, family management has a greater positive impact on the value of small- and medium-sized family enterprises.

3. The Meaning of Family Business Innovation

Innovation is an important driving force for economic growth and social progress, and enterprises occupy a dominant position among the participants in innovation. More and more family businesses have developed and grown, which can inject a steady stream of vitality into China's economic development, provide many high-quality jobs for the society, and have important significance for the development of the country and society [12] After the "innovation-driven development" strategy was proposed in China, China's family enterprises responded to the call of the state, actively carried out enterprise innovation activities, and strived to improve their scientific and technological strength and market competitiveness. The innovative activities of family enterprises can contribute to the high-quality development of China's economy and cultivate more outstanding technologies and talents for practical

production and application for the society. Figure 3 shows that family businesses have some significant management characteristics compared to other types of businesses. For example, the capital of a family business is mainly controlled by a family, the main leadership positions of the family business are held by family members, the management and management rights of family businesses are controlled by family members, and the power and resource allocation of enterprises are guided by blood relations.

Innovation investment shows the willingness and ability of enterprises to innovate and is the manpower invested by enterprises to achieve innovation.

Increasing material and financial resources is the premise of realizing technological innovation and product innovation. Schumpeter pointed out that innovation input is the key for enterprises to obtain competitive advantages, and realizing benefits is enterprise innovation. Schumpeter pointed out that innovation investment is the key for enterprises to gaining competitive advantage, and achieving benefits is enterprise innovation.

The main reason for the investment: from the perspective of investment theory, Zhong Teng proposed that, compared with traditional investment, innovative investment has three characteristics: one is the high sunk cost and adjustment cost, the second is the high risk, and the third is the long cycle. These characteristics make investment in innovation require not only the innovative spirit of managers, but also the company's sufficient funds to support innovative activities. Compared with nonfamily enterprises, the investment in innovation of family enterprises mainly comes from themselves, coupled with the high level of innovation activities, as shown in Figure 4. The characteristics of risk and long cycle make family businesses quite limited in their investment in innovation.

Promoting the innovation of domestic enterprises and realizing the transformation of enterprise growth from epitaxial "quantitative" growth to endogenous "qualitative" mode require not only state-owned enterprises to play a "bellwether," but also a wide range of innovative activities in private enterprises to achieve the healthy and balanced development of social innovation. Family businesses are an indispensable and important part of the private economy. The rapid development of China's real economy is also inseparable from the contribution of family enterprises.

4. The Innovation Environment

4.1. The Meaning of the Innovation Environment. The concept of Innovation Milieu was first proposed by the Regional Economic Research School represented by the European Innovation Environment Research Group, which emphasizes the synergy between the main and collective efficiency of innovation in the industrial zone and the innovation behavior. The innovation environment should include hardware infrastructure and related soft factors [13], and the innovation environment, as the basic support of the innovation system, plays a very important role in improving the efficiency of innovation. In addition to considering the most basic economic environment, the

TABLE 1: Financial and nonfinancial objectives of family businesses.

Financial and nonfinancial objectives of family businesses	
Financial objectives (economic efficiency)	Nonfinancial goals (socio-emotional gains)
Maximizing profits (shareholder returns)	Creating and protecting the family's spiritual wealth
Sales revenue	Showing family prestige
Profits	Continuing family values
Market share	Continuing the influence of family social status
Rapid growth and scale expansion	Meeting the family's emotional homecoming needs
Getting bigger and stronger fast	Planting deeper, living longer
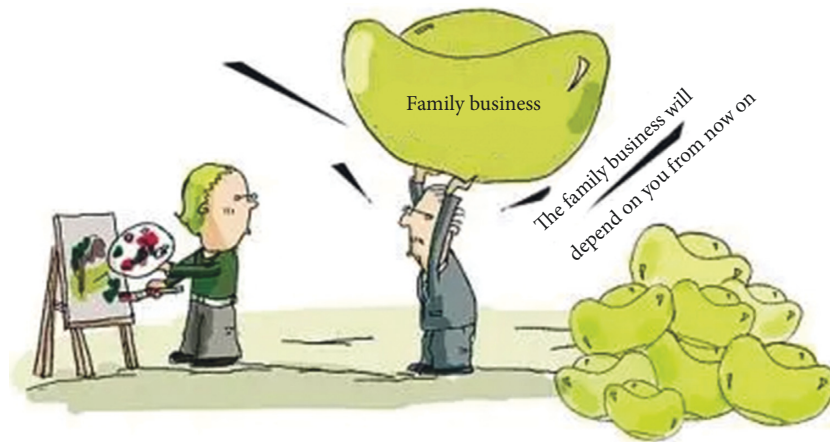
FIGURE 3: Family businesses.
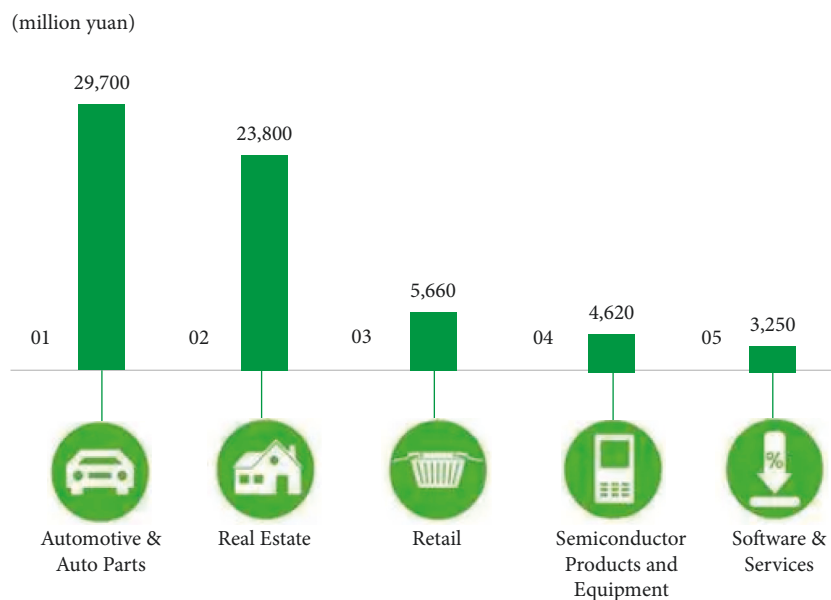
FIGURE 4: Example of family business investment.

innovative environmental indicators in the early studies focused on infrastructure factors. Recently, information infrastructure has been increasingly embraced by the scope of the innovation environment [14], and financial development has been included in the innovation environment as shown in Figure 5 [15].

The innovation environment is an external driving force that stimulates the innovation vitality of enterprises and promotes the investment of enterprise innovation. However, in the period of economic transition, due to the different macroeconomic conditions, market demand potential, and institutional and cultural

mechanical equipment — 142
chemical industry — 82
Medical Biology — 58
Electronics — 51
Delivery equipment — 48
Light industry manufacturing — 43
Building materials — 39
information service — 37
Textile clothing — 35
real estate — 31
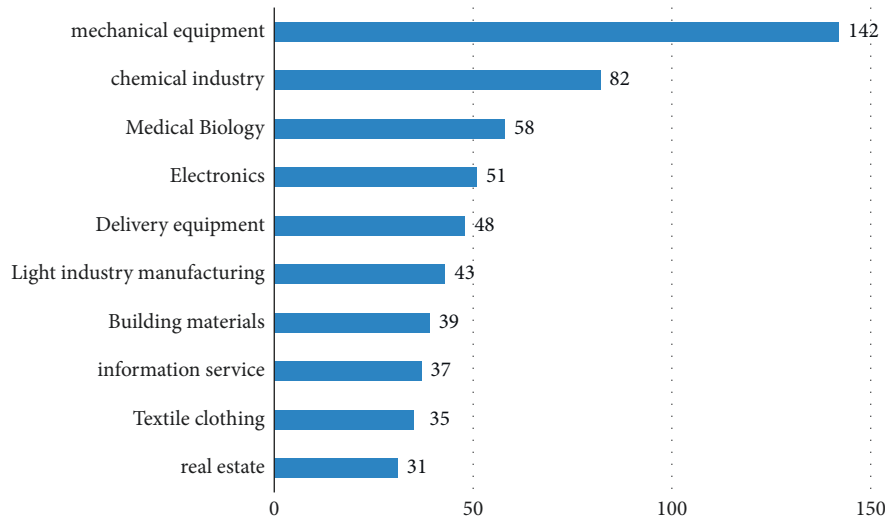
FIGURE 5: Family business industry distribution.

backgrounds of different regions, the innovation environments of various provinces and cities in China are very different.

Cai Xiuling believes that the innovation environment is an institutional factor that provides various opportunities and political guarantees for innovative activities. It is a general term for national policies and regulations, management systems, markets, and services. Foreign scholar Adalot believes that the constituent factors of the innovation environment are the institutions, rules, and practices in the region, which are used to coordinate the inputs and outputs of various innovators in the region. This idea is similar to the idea expressed by Marc Granovet, a sociologist at Stanford University in the United States; that is, economic action is deeply rooted in social action. Both reflections focus on the innovation system rooted in the specific innovation environment. After synthesizing domestic and foreign literature and the research objectives of this article, I believe that the content of the innovation environment should cover factors such as the main body, the management system, the service system, and the cultural atmosphere in which it is located. For these concepts, the universally accepted explanation is the "innovation environment" proposed by Fromhold in 2004. First, the innovation environment is a social contract that encompasses all informals. It is also a network that promotes mutual trust and support and strengthens communication to innovate new products. Second, because it is limited by the spatial distance of the actor, the speed of material circulation is fast and people communicate closely, thus achieving a more efficient rate. Beyond that, the innovation environment is both inside and outside. This overlay will further stimulate consistent behavior between subjects.

4.2. Identification of the Innovation Environment. According to the European Research Group on the Environment for Innovation (GREMI), companies can be seen as products of the environment and as places where innovative companies are nurtured. The environment is necessary for innovation, and technical know-how, local linkages and local inputs, proximity to the market, and access to high-quality labor in the environment are all factors that determine regional innovation. Together with other enterprises, training centers, technology transfer centers, and local authorities, enterprises should use the resources of the environment to jointly produce new forms of localized production organizations and create an environment conducive to innovation.

GREMI identifies the innovation environment in five ways:

(1) The external image of the innovation environment is reflected through the actors, social perceptions, and enterprises and institutions in a certain area.

(2) The innovative environment has its internal expressive logic, that is, the self-organization process of human resources. Homeland is structured according to the specialization and functionalization of integration. Micro, meso, and macro levels are coordinated.

(3) In the collaborative process of innovation environment, non-economic market areas must be expanded. At the same time, the synergy of the environment is also manifested in the diffusion of innovation.

(4) Innovation environment provides an environment for common learning. In the process of common learning, the self-development logic of different innovative operation schemes has been formed.

(5) Innovation networks require integrated and flexible specialization. Form a network of strategic alliances

and SMEs that are interdependent locally, as well as a network of innovation levels.

GREMI expands the environment of innovation from a relatively small community to a region; an environment of innovation is related not only to science and technology themselves, but also to sociocultural ideas. And the exchange of information and knowledge is disseminated not only through material means (communication and computer networks) but also, importantly, through informal and "invisible" chains such as human-to-human contact. The innovation environment is related not only to market space and production space but also to support space. All of this provides new ideas for creating an innovative environment.

4.3. Research on the Innovation Environment. For the innovation environment, scholars and experts at home and abroad have done certain research, and the collaborative innovation environment includes a variety of factors that can affect the occurrence of the entire collaborative innovation activity. Current research focuses on how to build an innovation environment and what impact it will have on collaborative innovation.

In terms of the definition of the innovation environment, at present, the academic community has not yet formed a unified definition of the concept of the innovation environment, which was first proposed by GREMI; it is defined as the external environment in which various innovative subjects can cooperate with each other in the complex social relationship of improving the ability of technological innovation [16]. Camagni argues that the innovation environment is one that encompasses local production systems, the various actors involved, and the influence of their industrial cultures, which together interact with markets, cooperation, or networks, resulting in a localized and ever-changing process of learning together [17]. StorDer believes that the innovation environment is a combination of institutions and various rules, and the external environment composed of this combination has a certain role in promoting the mutual cooperation and mutual learning. In China, Jia Yanan defines the innovation environment as an external environment such as material and cultural environment that can support the region's desire to obtain stronger development capabilities, so that all innovative entities can better develop together and form a relatively stable external environment. Huang Qiaoqing believes that the innovation environment is based on the unique current situation in China and that the innovation subject can pass the constraints of the policies, systems, and external environment that can coordinate the common development of various innovative subjects [18]. Cai Xiuling defines the innovation environment as the policy environment including laws and regulations, the current management system, and the economic market and service environment, which can provide rule support and institutional structure support for innovation activities. Through the combining of relevant literature, we can find that the basic agreed definition of the innovation

environment and the external environment required by each participant in innovation can effectively play its role and promote the cooperation between the innovative subjects, which can provide important support for the overall collaborative innovation as shown in Figure 6.

In terms of the interaction between the innovation environment and the performance of collaborative innovation, different scholars have also adopted different methods and conducted a series of studies based on different levels. For example, Zhao Fumin divided the innovation environment into two types: government-led and market-oriented. After sorting out and normalizing the relevant scientific and technological statistics, the data of the innovation environment and innovation performance were returned to the panel, and a series of evaluations and analyses were carried out on the relationship between the two according to the different situations of the empirical results [19]. Zhang Lijun constructed a regression model after analyzing the innovation environment and the current situation of innovation capabilities and analyzed the impact of the innovation environment on innovation capabilities, indicating that market demand is the factor that can most affect regional innovation capabilities at this stage. Zhou Xuerong measured the innovation efficiency by the Malmquist index method, conducted a regression analysis of the innovation efficiency based on the panel data of the innovation environment for four years, and found that the innovation environment has a great impact on the innovation efficiency of high-tech enterprises. Wang Peng used Moran's I index method to conduct a spatial autocorrelation test on the innovation environment and innovation input, and the results showed that indicators such as loan balances of financial institutions had obvious positive effects on the overall innovation efficiency. Wei Xinxin used interaction term models and panel data to study how the innovation environment plays a role in the performance of high-tech industries.

Through the collation of relevant literature, we can see that when studying the current situation of the innovation environment, scholars from different disciplines use different methods to construct relevant index systems according to their actual needs. In the evaluation of collaborative innovation performance in the innovation environment, the most representative source is the "China Regional Innovation Capacity Report," but the report does not clearly fix the specific indicators at each level of the innovation environment. As is shown in Figure 7, at present, most scholars rely on the content of the report on the construction of the innovation environment, combined with the actual situation, to build their own innovation environment levels and specific indicators at each level. On this basis, the relationship between the two was studied using different evaluation methods. It can be seen that it is necessary to select appropriate indicators and appropriate methods to conduct a series of analyses of the impact of the innovation environment on the performance of collaborative innovation.

Family business inheritance plan formulation
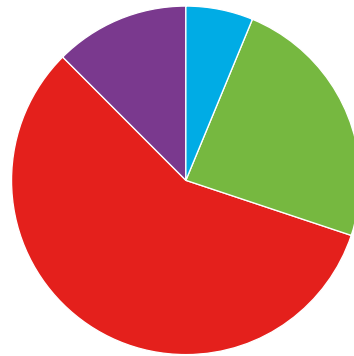
- ■ There is a more formal inheritance plan
- ■ No inheritance plan
- ■ The inheritance image is not very clear
- ■ other

Figure 6: The family business inheritance plan.
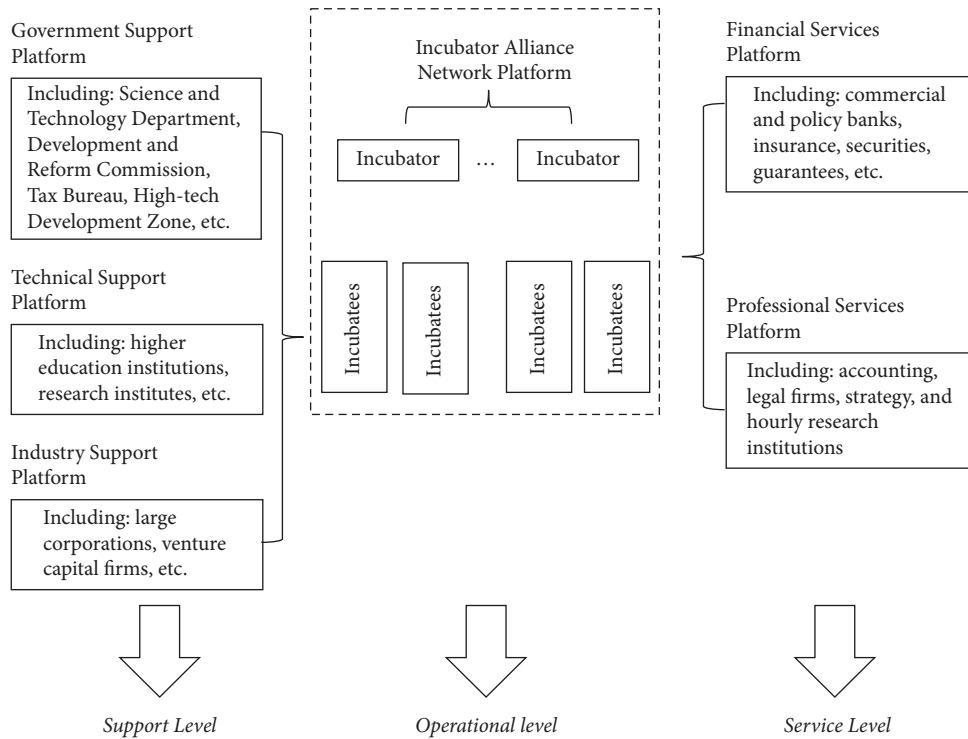
Figure 7: Business incubators.

4.4. Innovation Environment and Innovation Input of Family Enterprises. Research shows that when the survival and development of family enterprises are threatened, they will improve their risk tolerance and increase investment in enterprise innovation, so as to establish competitive advantages through innovation and realize long-term survival of enterprises, so as to protect the economic and emotional wealth of the family [20].

Based on the analysis of the previous article, the profit and loss of social emotional wealth is an important decision point for family enterprises to increase innovation investment. However, the strategic decisions of enterprises are the result of a combination of internal and external environments, and differences in external environments can lead to differences in the social emotional wealth [21], which in turn makes the level of innovation investment of family enterprises different. In areas with a poor innovation environment, family businesses often face problems such as insufficient innovative talents, single financing channels, and imperfect legal

environment, which will increase the risk of enterprise innovation activities. In this case, in order to avoid the loss of social emotional wealth, the family business will reduce the investment in innovation. On the contrary, in a good innovation environment, the market generally has a sound legal environment and a sound financial and taxation system and gathers a large number of outstanding talents. At the same time, enterprises have more independent choices and can choose their preferred projects according to market demand for innovative investment. In this scenario, the risk of loss of social emotional wealth caused by the company's innovation will be greatly reduced, which will help promote the family business to increase innovation investment. In addition, studies have shown that when the survival and development of the enterprise are threatened, the family business will increase the risk tolerance and increase the level of investment in corporate innovation [22], in order to establish a competitive advantage through innovation, achieve long-term survival of the enterprise, and thus protect the family's economic and emotional wealth.

5. Conclusions and Policy Recommendations

Family businesses are a complex of interactions and connections between families and businesses, and their innovation inputs weigh not only economic, but also noneconomic goals. This paper examines the impact of social emotional wealth and innovation environment on the innovation investment of family businesses in a pluralistic context. The results show the following: (1) the impact of different dimensions of social emotional wealth on the innovation investment of family enterprises is different; (2) the innovation environment of the region where the family enterprise is located will also have an impact on the innovation investment of family enterprises.

Based on the research conclusions, this paper puts forward the following policy recommendations: (1) China's family enterprises should be aware of the dual impact of social emotional wealth on the innovation investment of family enterprises, in order to minimize the negative effect of social emotional wealth, and cannot blindly reduce the intensity of innovation investment in order to maintain family control and family identity, which will directly affect the transformation and upgrading of family enterprises and long-term development. (2) In the special period of transformation, family enterprises should establish good ties with the government, which helps enterprises to grasp the market trend in a timely manner and obtain certain indispensable key information and resources, thereby reducing the risk of family enterprise innovation activities and promoting enterprises to improve the level of innovation investment. (3) Family enterprises should strengthen the cultivation of second-generation capabilities and qualities and, at the same time, appropriately allow second generation to enter the enterprise as soon as possible, giving them sufficient time to contact corporate governance and accumulate management experience, so as to give full play to the positive role of intergenerational inheritance in enterprise innovation

investment. (4) The innovation environment is an external driving force that enterprises cannot ignore to carry out innovation activities. The government should establish a market environment of fair competition and sound laws and regulations and give full play to the role of market mechanisms in allocating innovative elements. At the same time, it should strengthen the effectiveness and transparency of policies, standardize the incentive mechanism for innovation, and improve the innovation network system, so as to create a market environment conducive to the innovation of family enterprises, remove obstacles to the external development of family enterprises, and enhance the innovation power of family enterprises.

Data Availability

The labeled data set used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this paper.

Acknowledgments

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Review Article

An Analysis of Antinuclear Thought in William Golding's Literary Works from the Perspective of Ecoenvironmental Psychology: Taking "Lord of the Flies" as an Example

Kanshuai Jiang [1,2]

[1]College of Literature and Journalism, Xiangtan University, Xiangtan 411105, China
[2]School of Foreign Languages, Hunan University of Humanities, Science and Technology, Loudi 417000, China

Correspondence should be addressed to Kanshuai Jiang; 2069@huhst.edu.cn

In "Lord of the Flies," William Golding integrates the living conditions of human beings into the relationship of the community of destiny between man and nature and reveals the neglect of ecological morality in the modern Western ethical value system with modernity as the core, showing a postmodern ecological ethics consciousness beyond modernity. The novel embodies the ecological integrity of the nonbinary opposition between man and nature, criticizes anthropocentrism and technological rationality that destroy the ecological integrity, and points out that modern science and technology have led to greater ecological disasters due to the lack of ecological ethics. Ecological morality that respects nature and the harmonious coexistence of man and nature is advocated. The forward-looking ecological ethics consciousness contained in the novel is especially thought-provoking in today's serious ecological problems and lack of ecological ethics. This paper will use ecological psychology as a new interdisciplinary research field to study the relationship between man and nature and open up new horizons and research methods. In this way, we will solve the growing ecological and environmental crisis.

1. Introduction

When British writer Golding's famous work "*Lord of the Flies*" came out in 1954, the multifaceted genre of the work was quite uncertain for critics and readers. The novel is written about the encounters of a group of children who escaped into the children's world due to accidental events, which looks very similar to children's literature; because the story takes place on a desert island, it also resembles the desert island adventure novel in the Western literary tradition (the most familiar one). The masterpiece is Defoe's "*Robinson Crusoe*"; the plot is set in the future era of nuclear war, and it is like science fiction. But all of these are nothing more than literary forms that Golding consciously borrowed and adopted for everyone. In this form, writers explore and think about much more serious practical and philosophical issues. People are very prone to emergencies, such as tsunamis, ice and snow disasters, earthquakes, air disasters, terrorist attacks, and other emergencies. At this time, the inner balance will be easily destroyed, psychological disorders will occur, and some negative emotions such as tension, anxiety, fear, depression, and pain will usher in. Psychologists believe that everyone is constantly striving to maintain a state of inner stability in order to bring harmony between themselves and the environment. Therefore how to carry out psychological intervention, psychological adjustment, and psychological counseling, so that these social individuals can get out of the predicament, restore a good ecological subconscious, so as to better adapt to the changes in the external environment, especially how to correctly guide the young generation to treat scientific and technological development rationally, together with adults jointly shouldering due social responsibilities and devoting ourselves to the cause of world peace are topics that we will continue to explore, as shown in Figure 1.
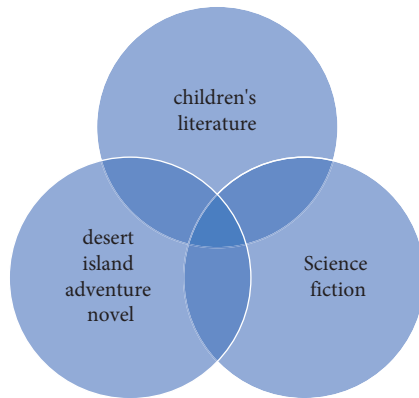
FIGURE 1: Literary form of works.

Ecoenvironmental psychology is a new discipline born from the organic integration of ecological psychology and environmental psychology in the context of environmental crisis in the early 21st century. Its source is ecological psychology [1]. Ecopsychology was born in the 1940s. Gestalt psychologist Lewin published "Psychological Ecology" in 1944. The concept of ecology was introduced into psychological research for the first time [2]. Three years later, another psychologist, Wicker, established a field research station for Chinese and Western psychology in a small town in the United States, advocating natural research methods and behavioral background theory, which marked the beginning of the discipline of ecological psychology [3]. The organic integration of this concept with environmental psychology was in the 1980s. In 1987, the American scholar Jacobs put forward a research theory different from traditional psychological experimental methods on the basis of Buck's ecological psychology research, namely, environmental psychology theory, which focuses on human behavior in natural situations [4]. There was a particular emphasis on the detailed and objective psychological description of human natural behavior in the role relationship with the environment. On this basis, the environmental psychologist Bell first put forward the concepts of environmental psychology such as arousal, overload, adaptation level, behavioral restraint, and stress in his book "Environmental Psychology" published in 2001, which created the conditions for the birth of ecoenvironmental psychology [5]. In 2004, the ecological psychologist D.D.N. Winter and others officially clarified the concept of "ecological environmental psychology" in their book "Psychology in Environmental Problems," which focuses on the study of environmental physical quantities [6]. The relationship between the environment and the psychological quantities of the environment included the relationship between the environment and people's thinking, emotion, will, and personality, as well as the law of the environment's effect on people's psychology and behavior, including the natural environment (such as noise, temperature, wind direction, climate, and air pollution) and social environment (such as personal space, regional ideas, social atmosphere, social culture, and interpersonal relationships) [7]. In addition, the impact of environmental associations on environmental

awareness and psychology, as well as the impact of psychological changes in the process of environmental pollution on the way the human body transmits information and behavior, and how people conduct psychological self-regulation under different environmental conditions to adapt and create a kind of the environment conducive to individual development are the main research content of this new discipline [8].

In view of this, it is a beneficial exploration and attempt to introduce this research into the utilization of nuclear technology [9]. Since the discovery of nuclear fission in 1938, the development of nuclear technology has gone through 84 years of development history. The invention of nuclear technology is recognized as one of the greatest technological inventions of the 20th century, because it has greatly changed the course of human history, including the military use of nuclear energy; for example, the US dropped two nuclear weapons on Hiroshima and Nagasaki, Japan, in 1945 [10]. After the atomic bomb, World War II came to an end, and, from the 1960s to the 1990s, the two superpowers, the Soviet Union and the United States, continuously threatened nuclear weapons, which led to a serious threat to world peace and a deepening fear of people [11]. It also includes the civilian development of nuclear energy since the 1950s, which has made an important contribution to effectively alleviating the world energy crisis [12]. However, it should be noted that, due to paralysis, neglect, and natural disasters, nuclear power generation still poses a serious threat to human life and property safety and environmental protection. The nuclear leak from a nuclear power plant shocked the world [13]. Therefore, since the birth of nuclear technology, nuclear technology has been like a sword of Damocles hanging over people's heads from time to time. It requires people to think about its safe use and strengthen prevention. Human psychology and behavior are not only related to sociocultural factors but also related to the natural environment, as well as environmental psychology from the perspective of psychology and behavioral science, to explore the impact of the environment on people's psychology and behavior. Among them, the introduction of ecological and environmental psychology can help people effectively explore the relationship between environmental physical quantities and environmental psychological quantities in the context of the abuse of nuclear technology, so as to better reveal the law of the effect of the damaged environment on human psychology and behavior [14]. In addition, explore what kind of psychological changes environmental changes bring to people and what coping and intervention mechanisms should be adopted to make psychological adjustments so as to better adapt to changes in the external environment [15]. The protection of life and property and the environment has important theoretical guiding significance and great social value [16].

Similarly, some literary works speak about the effect of the environment on people's psychology and the effect on people's behavior; therefore putting ecological environment psychology into literary works for research can not only expand the horizon of literary research but also better explore the depth of the works' thoughts and reflect the

educational function of literary works, especially if they are embedded in ecological literary works. This can better reflect the value of this research [17]. Because ecological literature reflects the interaction between man and the natural environment, different interactions between man and nature will have different effects on their respective evolutionary development. Nuclear literature, as shown in Table 1, which belongs to the category of ecological literature, can better reflect this relationship, because the consequences of nuclear science and technology are the greatest and most profound impact on the natural environment in the application of all scientific and technological achievements, especially the abuse of nuclear science and technology with catastrophic consequences [18]. Through these works, they express not only the pain and pity of nuclear victims but also an appeal to human society, calling for peace, calling for humanitarianism, and calling for human reason, which are the common characteristics and cores shown in these works. Therefore, according to the many painful lessons of human history, combined with their own rich imagination and other forms of literary fiction, the works of many writers in the world have revealed this theme.

These works reproduce the huge disasters brought to mankind by various nuclear explosions, nuclear leakage pollution, and the profound thinking they have made. Many writers have even won the Nobel Prize in Literature for this, as shown in Table 2.

These works further highlight the depth of the social reality reflected in ecological literature such as nuclear literature and the urgency of preventing the misuse of nuclear technology. In addition, these works also show the various psychological and behavioral expressions of people after the nuclear war and nuclear leakage accident, as well as the intervention mechanism and psychological adjustment adopted by these social individuals in order to better survive. For the sake of long-term development, Pausewang, a German female writer, from the perspective of ecological subconsciousness, specially explores the various psychological changes that children and adolescents show in the face of nuclear disasters [19], that is to say, in the face of a nuclear disaster, how people should activate their ecological subconscious and awaken the inherent and healthy environmental interaction consciousness within the ecological subconscious and how to search for various psychological therapy aiming to heal the sense of alienation between people, between people and families, and between people and society and cultivate children with a sound scientific and technological ethics and a sense of moral responsibility, so that they will eventually move towards ecological environmental psychological self-maturity, feeling the beautiful life experience of all things in nature and finally combining world peace with personal happiness; this is the original intention of King Bowser. From the perspective of ecological and environmental psychology, taking author William Golding's work "*Lord of the Flies*" as an example, the following will focus on analyzing how the psychology and behavior of adolescents and children are affected after the nuclear disaster and what people do to them. Moderating and intervening mechanisms to understand the writer's

intent in writing, the need for warnings about the misuse of nuclear technology, and the need for nuclear safety education, this will play an extremely important role in enlightenment education for the prevention of social risks and the healthy growth of the next generation of human beings.

2. The Psychological Impact of the Nuclear Disaster on Social Individuals, Especially Adolescents and Children

Like natural disasters, nuclear disasters also have three characteristics in common: suddenness, unpredictability, and destructiveness [20]. Specifically, when nuclear explosions or nuclear leaks occur, nuclear disasters are often sudden, powerful, and uncontrollable, and they produce huge damage in a very short time and cause chaos and even destruction in the lives of human and other living beings. Unlike natural disasters, nuclear disasters also have their own characteristics, as shown in Figure 2.

Some studies have found that although natural disasters will bring negative effects on people, such as helplessness, pain, sadness, and other emotions, they can also bring many positive effects, such as social and human solidarity, mutual care, and a sense of social belonging. But technological disasters are different. When a nuclear disaster occurs, although society and individuals also show mutual help and care, psychologically and emotionally, they are more manifested as frustration, depression, curse, pain, withdrawal, numbness, anger, despair, and so forth. In addition, in terms of behavior, people often show selfish behaviors such as selfishness, numbness, rejection, and rejection in order to survive, which is very different from the behaviors that people show in natural disasters.

2.1. Work Abstract. During a nuclear war in the future years, a group of British children were evacuated to the rear, and the plane was hit by artillery fire over the Pacific Ocean and fell into the sea. The children who survived escaped on a tropical desert island. At first, the blond boy Ralph and the fat boy with glasses nicknamed Piggy established a civilized order. Everyone divided labor and cooperated, lived together according to the rules and regulations, and lit a fire, hoping to be rescued. However, the bad weather, strange and mysterious environment, and terrifying beasts made everyone feel uneasy. According to some clues, they always thought that there were monsters on the island. Gradually, a big boy named Jack started a conflict with Ralph and the others. He advocated wildness, violence, and bloodshed and was unwilling to wait for rescue according to the rules. He succeeded in pulling most people to his side by this means. Simon is the opinionated one among the children, though he was a little absent-minded on the surface. He found out the truth about the legendary monster and *Lord of the Flies* and was about to tell everyone the whole story. The irascible Jack and his gang did not want him to tell anyone about his discovery, so they bludgeoned him to death. Later, Jack's group smashed Piggy to death and set fire to the jungle on the island, launching an island-wide search to hunt down

TABLE 1: "Nuclear" writers and their works.

The originator of nuclear literature, British science fiction writer	Welles	"A Free World" (1914)
Swiss playwright	Dylan Matt	"The Physicist" (1962)
Japanese writer	Ibushi Troji	"Black Rain" (1965)
German writer	Wolf	"Nuclear Accident: A Day in the News" (1988)

TABLE 2: Nobel Prize winners and their "nuclear" works.

Japanese writer	Kenzaburo Oe	"Hiroshima Notes" (1964)
German writer	Glass	"The Mother Mouse" (1986)
Belarusian writer	Alexievich	"Memories of Chernobyl, Oral History of the Nuclear Disaster" (1997)
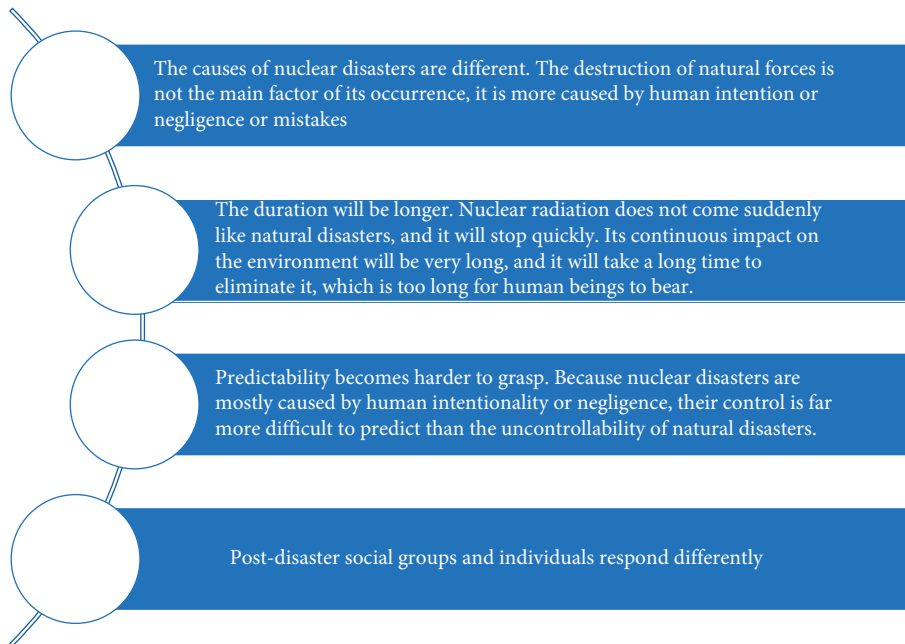
FIGURE 2: Characteristics of a nuclear disaster.

Ralph. Just as Ralph was cornered, a navy ship appeared on the beach. Facing the incarnation of civilization from the adult world, Ralph could not help but burst into tears.

2.2. Appreciation of Works. Reading through "*Lord of the Flies*," it is not difficult to find that although the children are far away on a desert island, they are always shrouded in the huge shadow of the ongoing bloody war in the adult world. They left their parents and relatives and were forced to evacuate their homeland because of the threat of nuclear war; the reason why they set foot on the desert island was the direct result of the ruthless artillery shooting down their landline. Painful experiences and spiritual trauma are deeply embedded in their young minds, which are the psychological reasons why children are restless, nervous, and panicked all day long on the desert island. At the same time, the abnormal and extreme actions of children, such as zealously hunting wild boars in swarms, notwithstanding the curiosity and adventurousness of children, also have the need to satisfy their appetite and seek survival, which is also directly influenced by the behavior of war. Because of this, through

bloodthirsty slaughter again and again, hunters have become murderers, companions have become sacrifices, children themselves have become cannibal monsters, Xanadu has become an arena and a morgue, and the world of innocence has become the base of evil. The wreckage of the plane, the corpse of the paratroopers, and the rescued "warship" in the novel remind readers from beginning to end that children on the desert island simply replay the roles that adults have always played in the big world outside. The island is but a microcosm of the real world, and the ominous giant shadow of "*Lord of the Flies*" looms over the entire planet. Thinking of World War II, which just ended, as well as the Korean War and Vietnam War that resurfaced in the 1950s, the meaning of the future world depicted in "*Lord of the Flies*" is quite clear.

Clearly, "*Lord of the Flies*" is essentially a modern fable. Its implication is not only the confrontation between civilization and barbarism in the context of war but also a deep insight into the heart or human nature. People have human nature, human nature has laws, and the essence of the law of human nature is seeking benefits and avoiding harm. It not only ensures the survival and reproduction of human beings

but also causes various social chaos. Golding famously argued that the flaws of society should first be attributed to the flaws of human nature, and his most important mission as a writer is to heal "man's astonishing ignorance of his own nature." Unlike the Chinese who believe that "nature is inherently good," Golding agrees with most Westerners that human nature is inherently evil. He demanded that his works must be done so that people can face up to "the sad fact of human cruelty and greed." "*Lord of the Flies*," like Golding's other works, is also about the "darkness of the human heart." Golding's view of human nature and his exploration of human nature have profound ideological origins in Western culture. Both Plato and Aristotle expressed the following views in different terms: man is the best among animals, and he may also be the most savage among animals. Golding holds essentially the same view but prefers to reveal the "darkness of the human heart," pointing to the fragility of civilization. Undoubtedly, this is the result of the repeated impact on the writers' artistic imagination by the constant cruel facts of human social wars in the twentieth century.

The theme of the novel is "the darkness of the heart." The excerpt of the story is that after Simon found out the truth about *Lord of the Flies* and the monster, he was ready to report to everyone. Jack and his group roasted wild boar on their own site by the coast to eat. Ralph and Piggy came to check what happened, which is shown in Figure 3. It turns into a maddening spree, and Simon is killed as a beast by the deranged children. The theme is divided into two layers the face unfolds, one is the defeat of Ralph and Jack, and the other is the death of Simon.

By this time, Jack had won over most of the children with his fresh, exciting, and lucrative wild boar hunting. Ralph and his faithful companion Piggy are effectively isolated, with boredom and nothing to do to pass the time. When they came to Jack's group, they were devouring roast pork with relish, leaving them both out in the cold. In the face of Jack's public challenge, Ralph reaffirms his position as the leader. But, in the confrontation between the two, most of the children sided with Jack and were no longer willing to obey any rules. Ironically, even Ralph and Piggy themselves could not resist the temptation to eat roast pork. In Jack's provocative "who wants to join my team" over and over again, Ralph was defeated. He wanted to blow the conch shell to hold a meeting, but everyone was reluctant to listen; he proposed to maintain the fire, but no one paid any attention. Pork, which symbolizes sensual needs, finally defeats the conch, which symbolizes the call of the spiritual soul. The question of whether or not to get rescue and escape from the desert island has also become secondary.

Therefore, the novel "*Lord of the Flies*" is actually a record of the destruction of civilization by barbarism, not a paean to civilization over barbarism. The state of innocence, which is not bound by any laws of civilization, is the state of savagery. The only criterion for selecting barbaric state is whether it is beneficial or effective to maintain survival and development, and then continuously, repeatedly, generation after generation, continuously, and effectively maintain the primitive, barbaric, and ignorant state of existence and
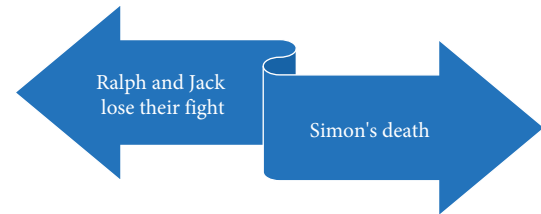
Figure 3: Two levels of thematic expansion.

development. In a state of savagery, what the human heart has is only instinctive desires, and the senses dictate everything. Such a description obviously denies Rousseau's view that "the return of nature will make the noble savages" and also denies the romantic myths that glorify innocence. Although this pessimistic view of "sex is inherently evil" cannot be said to be comprehensive, it has its own profoundness. Although it is possible to view everything in the world, including human beings, optimistically, blind optimists are not necessarily more sober and wiser than serious pessimists. On the contrary, the view of "evil human nature" can remind people to understand themselves more comprehensively, to actively guard against and prevent their own arrogance, and thus be more profound and valuable.

Simon's death has a deeper meaning and is doubly thought-provoking. Before that, Simon had figured out that the legendary *Lord of the Flies* was actually a large group of flies that fell on the pig head that Jack offered to the gods. Ultimately, *Lord of the Flies* was born thanks to people. First, the material conditions that cause this phenomenon are provided by humans. If Jack had not sacrificed such a big pig's head, there would not have been a gathering of flies. Second, after this phenomenon occurs, people do not study the reasons in detail but rather exaggerate it as an evil spirit in imagination or delirium and exaggerate it as the primordial spirit of flies. The latter aspect was also experienced by Simon during the spasms. In the excerpt, we see that Simon further understands what happened to the monster that once shocked everyone—it turned out to be the corpse of a paratrooper bound by a parachute. The corpse and bones of the corpse also had flies gathered, emitting bursts of stench and making irregular movements. All of this confirms what Simon once said: "The real monster is ourselves." Although this sentence was regarded as a delusional nonsense and was ridiculed by everyone, it was indeed the case.

Simon has reached the realm of truth, that is, can continue to use and utilize the unique superiority of superb consciousness and wisdom, and, under the effective support, guarantee, motivation, and enlightenment of the superiority of consciousness and wisdom, it can continuously maintain the survival and development more. He has discovered that all demons are actually nothing more than man's own demons. But when he overcame his illness, overcame the difficulty of walking, climbed out of the jungle, and was intent on telling everyone the truth he had discovered, tragedy struck: the children, who had fallen into primitive ecstasy by their revelry, saw him as a "monster" and killed him. This dramatic turning point is a metaphor for the

deepest darkness in the human heart: people create and release the devil by themselves, but they do not allow others to expose it, and they dare not face the truth.

Therefore, Simon is the only real hero in the novel, who sacrificed his young life to prove the truth. The description of Simon's body flowing into the sea is full of hazy and mysterious poetry. The author deliberately arranged for a strange little silver creature in the ocean to coalesce into a moving light and shadow, surrounding Simon and bordering his body after death with a shining edge. Under the reflection of the starry sky above him, the body itself is also shining silver. Undoubtedly, this is a sacred sea burial for Simon, to prevent his body from falling into the black mouth of *Lord of the Flies*.

3. Postdisaster Psychological Intervention and Confidence Recovery Can Help Adolescents and Children Carry Out Psychological Reconstruction

"*Lord of the Flies*" fully shows the characteristics of fables. Behind the blending of realistic scenes and touching brushstrokes, the characters and plots all contain symbolic meanings. For example, Simon can be called a prophet, Ralph represents honesty and integrity, Piggy represents reason, and Jack is the incarnation of the devil; their quarrel and even confrontation symbolize light and darkness, order and chaos, and savagery and civilization struggle. Even the entire world of children on a desert island can be seen as a symbol of humanity in its original state. There, "evil" occupies an absolute dominant position. It gradually diffuses from the depths of the human heart, swallows up the remaining conscience of the human heart with its irresistible power, and finally has the trend of destroying everything, appearing as *Lord of the Flies*. "*Lord of the Flies*" is etymologically traced back to the Hebrew "Baalzebub." In the "Bible," "Baal" is the head of all evil and the king of destruction. Therefore, the essence of "evil" in Golding's writings is the instinct of destruction in the impulse of primitive life will. What the novel "*Lord of the Flies*" does is leading us to cast aside the bouquets and veils of romance, to force us to see the bottomless abyss before which we can tremble and mourn, but in the end we must muster up and have the courage to face it and take responsibility.

The novel "*Lord of the Flies*" reflects the epitome of a real small world encountered by adolescents and children in the face of disaster and has commonalities with nuclear strikes. These all reflect various psychological changes in society, environment, and people in the context of nuclear strikes. In particular, looking at these changes from the perspective of the growth of adolescents and children will have an important impact on the formation of their ecological subconscious, their psychological growth, and their behavior.

After a disaster, people suffer from negative emotions such as fear and worry, as well as feelings of helplessness, sadness, and guilt. How to eliminate all kinds of psychological obstacles, restore the inherent and healthy ecological subconsciousness in the heart, and actively and effectively find a cure for the gradual alienation between people,

between people and families, and between people and society and finally move towards mental peace, the maturity of the personality and the beautiful life experience can be started from five aspects, as shown in Table 3.

4. The Significance of Strengthening Warnings and Safety Education on the Abuse of Nuclear Technology for the Growth of Teenagers and Children

Strengthening warnings and safety education on the abuse of nuclear technology is important for the growth of adolescents and children, as shown in Figure 4.

Although the content of this novel is the depiction of disasters, and the disaster scenes even seem cruel, "cruelty" is not a gimmick that the writer can manage. On the contrary, these "bloody, scorching purple and black" scenes and various psychological activities reflect the writer's well-intentioned warnings, exhortations, and incentives. The purpose of its warning is that the abuse of science and technology that is not constrained by ethics will only bring disaster to mankind and lead mankind to the abyss of eternal redemption; the purpose of its exhortation is more exchanges and cooperation, more love, and more peace in the world. The purpose of motivation is that the next generation should learn from the shortcomings of the previous generation and have good mental thinking; in the course of their growth, children and adolescents are able to carry out a warning effect and take the initiative to undertake the important task of maintaining world peace. Only in this way can human beings develop sustainably, which is the purpose of the writer's creation of this work.

4.1. The Relationship between Man and the Environment from the Perspective of Ecological Psychology. From the above novels and the description of the nuclear strike, it can be found that, due to changes in the environment, there are multiple changes in people's psychology, which affect their behavior; therefore, the relationship between human beings and the environment in which they live has always been a debated issue in many disciplines. This question also plagues the field of psychology, with different schools of thought having completely opposing viewpoints. Behaviorism insists on environmental determinism, while psychoanalysis and humanism exaggerate the role of individual internal factors. It is under this background that ecological psychology comes into being. To put it simply, the relationship between people and the environment is a relationship of mutual restraint and interaction. Among them, mutual restraint is reflected in man's dependence on the natural environment. Human beings themselves are the products of the evolution of nature, and the formation and growth of human beings, as well as their various activities, are inseparable from the need for nature and cannot get rid of the constraints of natural laws. It advocates people to establish correct ecological concepts, promotes the harmonious development between man and the environment, and fundamentally solves environmental problems and ecological crises.

TABLE 3: Postdisaster psychological intervention and confidence restoration can help adolescents and children in psychological reconstruction.

1	Start with the external environment and find spiritual comfort and spiritual sustenance from the restoration of nature
2	Restoring life order is an important means of treating psychological trauma
3	Reopening schools
4	Unlimited sympathy for crippled children from nuclear strikes
5	Reshape the image of the previous generation, bravely assume social responsibilities, and let the next generation grow up healthily in a peaceful environment
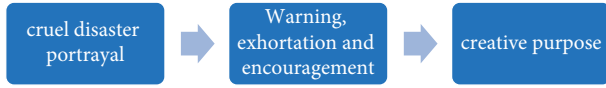
FIGURE 4: The profound context of the works.

In the 1930s, psychologist Lewin proposed a well-known formula for mental behavior: $b = f(p, e)$, where b represents behavior, f represents function, p represents person, and e represents environment. The formula indicates human behavior. It is a function of the interaction between people and their environment; that is, behavior changes with these two factors. The impact of the environment on people is mainly manifested in some aspects shown in Figure 5.

For the psychological value of the ecological environment to people, ecopsychologists believe that, in addition to historical, economic, and aesthetic values, the ecological environment also has psychological values. The psychological value of ecological environment has the value of development, healing, spirituality, and self-satisfaction, among which the psychological value of wilderness is one of the most valuable fields in ecological psychology, by influencing people's psychological nuclear behavior, so as to guide people to make corresponding psychological changes in nuclear actions. Ecopsychology not only believes that nature participates in people's psychological construction and promotes people's "psychological growth" but also reveals that people's psychology and nature have an innate "emotional connection," that is, "ecological subconsciousness." With the alienation of man from nature, this subconscious is suppressed, but this "emotion" is a kind of human nature, and man comes from nature; even after man stands up from nature and obtains the certainty of man, man is not beyond nature, and nature is still the foundation of human existence. There is still an instinctive emotional relationship between human beings and nature. As long as a certain situation occurs, it will appear in our hearts.

The influence of ecological environment on human behavior. With the industrialization and modernization of human society, the living environment of human beings, including the physical environment and social environment, has had a huge impact on human psychology and behavior. For example, environmental factors such as noise, crowding, pollution, and abnormal climate have seriously affected people's physical and mental health. Research in environmental psychology has shown that the incidence of major physical and mental diseases in life, such as depression and chronic fatigue syndrome, is positively correlated with the trend of environmental pollution or environmental deterioration.

FIGURE 5: The impact of the environment on people.

However, people are not completely at the mercy of the environment, and people's subjective initiative also affects and changes the environment all the time. In the face of nature, human beings regard themselves as the first of all things and strive for the infinite expansion of science and technology and the continuous growth of material production and show the value of their own existence by conquering nature.

5. Conclusion

In general, unlike traditional psychology, ecological psychology believes that the relationship between people and the environment is not an antagonistic relationship but a complex unified whole. But ecopsychology sometimes overemphasizes ecocentrism, the identity of man and animal, and ignores the social nature of man and the environment. It fails to recognize that the relationship between man and the environment is mediated by the relationship between human beings.

All in all, ecological psychology is a rapidly developing research field. It acknowledges that human beings are currently facing a serious crisis of the external living environment and at the same time advocates that, due to the long-term separation of human beings from nature, the inner world of human beings is also facing a spiritual crisis. As a new cross-cutting research field, ecological psychology has opened up a new vision and research method for the study of the relationship between man and nature. At present, the social environment is suffering from continuous deterioration, people are actively developing industry and economy at the same time, and the degree of attention to the environment is far from enough; this paper will introduce ecological psychology into social development. With the continuous deepening of its research, it will play an increasingly important role in dealing with the increasingly serious ecological environment crisis effect.

Data Availability

Conflicts of Interest

Acknowledgments

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Retraction

Retracted: The Optimization Strategy of College Students' Ideological and Political Management under the Internet+ Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] Y. Zhou, "The Optimization Strategy of College Students' Ideological and Political Management under the Internet+ Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 2556976, 12 pages, 2022.

Research Article

The Optimization Strategy of College Students' Ideological and Political Management under the Internet+ Environment

Ya Zhou ⬤

School of Marxism, Southeast University, Nanjing 211189, Jiangsu, China

Correspondence should be addressed to Ya Zhou; 230189863@seu.edu.cn

In order to better deal with the challenges brought by the changes of the external environment to the ideological and political work of college students and better solve the problems of dogma, lack of operability, and inability to adapt to the changes of the new situation and environment, this topic proposes a student management information system based on the artificial neural network. This method strengthens the construction of the student management system, deeply interprets the connotation and practical needs of ideological and political work in colleges and universities in the new environment under the background of the "Internet+" era, and is committed to further optimizing the strategy of student ideological and political work on the basis of following the principles of innovation, human nature, openness, and ecology of ideological and political work. The results show that the construction of a more scientific student teaching management information system can provide intelligent and digital technical support for the improvement of ideological and political work efficiency and teaching quality and promote the innovative development of ideological and political work in colleges and universities. Therefore, the ideological and political work in colleges and universities should gradually overcome preaching, build new methods to measure students' achievements and ideological and political arms, actively occupy the dominant power of Internet discourse, and avoid the negative impact of the network by spreading positive energy.

1. Introduction

Traditional university management is often in the form of meetings, documents, and other forms, which consume a lot of human and material resources. Management via Internet has improved efficiency, and compared to offline management, management via Internet is more energy-efficient and carbon-reducing, which plays a meaningful role in environmental protection.

The 2019 National Conference on Beliefs and Work Practices in Colleges and Universities made it clear that the principles of ethics and advocacy should be adhered to, and people should be regarded important in an environment for ideological and political work, ideological work and politics in colleges and universities, understand the teaching standards of colleges and universities to the greatest extent, understand the whole process of education for all, and cultivate community skills [1]. Many colleges and universities in China have been playing an important role in cultivating producers and graduates who develop relationships in moral, intellectual, physical, aesthetic, social, and other aspects. Therefore, vocational training in colleges and universities must adhere to the correct culture [2]. Colleges and universities have always been an important foundation for growing crops and providing skills for national development and prosperity. Qualified persons with high quality not only must first know the necessary qualifications and theoretical knowledge but also have a higher level of political knowledge. Therefore, in the era of "Internet+," the ideological and political work of colleges and universities must pay attention to the political commitment of students. Based on this principle, we must conscientiously adhere to the educational concept of keeping pace with time, and through the process of innovative design and efficient operation, strengthen the function of theoretical and political principles and good teaching level, as shown in Figure 1.

Students' dormitory

The classroom

Other
Campus library, football field, canteen, etc
Off-campus shopping mall, home
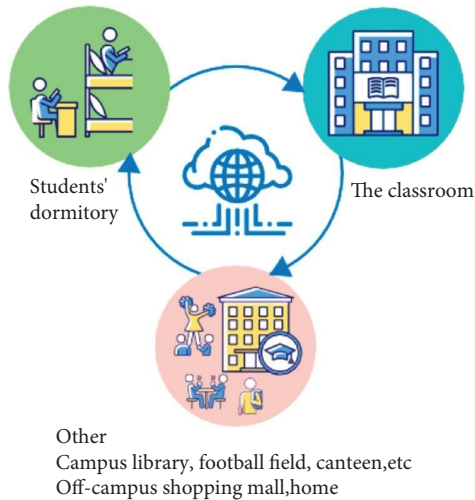
Figure 1: Student ideological and political management model.

2. Literature Review

Li and others believe that management is a universal social practice of mankind and was first formed in the West as a systematic and independent scientific theory. The history of Western governance has been marked by three developments: the administration in the 19th and 20th centuries, the ideological behavior in the 1920s and 1930s, and modern management since the middle of the 20th century [3]. Yuan and others said that these management theories are universal and have laid a management foundation for foreign academic circles to study issues related to the management of ideological and political education in colleges and universities [4]. Lee and others believe that ideological and political education in different countries has its own particularity due to their different national conditions and has its unique theoretical basis and language expression. Most of them use the terms of "civic education," "democratic education," "religious education," and "political socialization" as the expression of ideological and political education or ideological and moral education [5]. Sreelatha and others have argued that in order to achieve the goal of education and morality, however, governance is necessary. As a result, exploring its management in the study of thought and behavior in colleges and universities has become a recollection and awareness of the behavior of scientists [6]. Huang's and other theoretical studies of ideological discipline management and ethics in colleges and universities, mainly based on academic management and behavior, maintain ethics and govern staff in colleges and universities [7]. Li and others systematically expounded six management models, namely, the formal model, college model, political model, subjective model, fuzzy model, and cultural model [8]. Among them, the formal model emphasizes that colleges and universities are hierarchical systems, which should reasonably reflect the authority of managers in the organization; the college model is based on democratic principles and forms the common values of the organization through the professional authority of teachers; the political model focuses on the group activities in the organization and emphasizes the unity of

individuals, groups, and organizations; Chu and others said that the subjective model emphasizes the belief and understanding of individual members in the organization and pays more attention to the realization of individual goals; the fuzzy model mainly aims at the complex and unstable situation in the organization so as to deepen the individual's understanding of the organization; the cultural model emphasizes that the individual's way of thinking and behavior and belief and value system are the core of organizational culture. The interaction between individuals or groups can promote the formation of organizational norms [9]. Turner and others said that the above six theoretical models comprehensively reflect the in-depth exploration of relevant theories by foreign scholars on the basis of criticism and development and provide a new research paradigm for exploring the management model of ideological and moral education in colleges and universities [10]. Judging by the results of research by Wang Ping and others on this issue, the problems that exist in the management culture and politics in the colleges and universities generally include the following five factors. First, the business management strategy lags behind [11]. Verma and others believe that at present, colleges and universities adopt the traditional administrative command management concept, which is lack of innovation, adhering to the concept of "social standard" in management and ignoring the subjective needs of students and lacking humanism. Second, the management content is old. In terms of target management, it is pointed out that the content of target management is lack of pertinence, the planning of target management is lack of integrity, the formulation of objectives is lack of interaction, the implementation of target management is lack of flexibility, and the subjectivity of target management is lack of logic. In terms of decision-making management, it is considered that the goal orientation of its strategic decision-making is general and lacks quantitative standards. The plan focuses on the completion of short-term tasks and lacks long-term effectiveness. The investigation and decision-making system is not standardized. The information source of work decision-making focuses on the inside, the information analysis and processing is simple and rough, and the decision feedback is lack of summary and correction. Third, the management method is backward [12]. Chen et al. believe that the current problems in the management methods of college students' ideological and political education are mainly manifested in the emphasis on administrative methods, the neglect of micromanagement, the lack of practical activities, and the lack of psychological education. Fourth, the weakness of the management team points out that the construction of the management team is still lack of overall scientific planning, the overall combat capability is not coordinated with the carrying tasks, and the overall quality and positive image need to be improved. Fifth, the management mechanism needs to be improved such as lack of scientific operation mechanism. The cultivation mechanism and guarantee mechanism of management team are not perfect. The internal communication and coordination mechanism, information mechanism, and evaluation mechanism of the management system are imperfect [13].
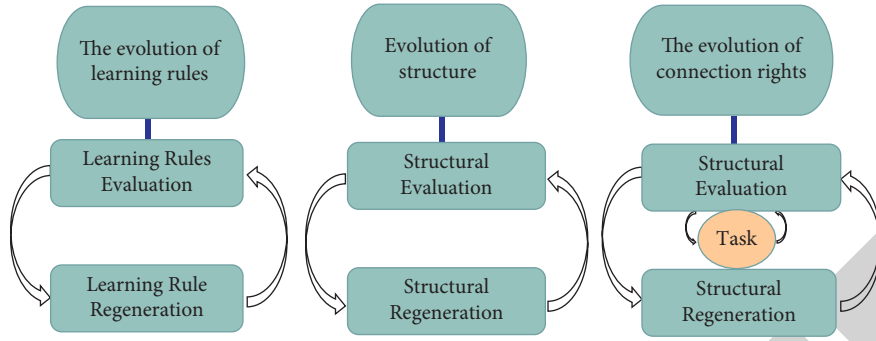
FIGURE 2: EPNN evolutionary learning system.

3. Student Management Information System Based on the Artificial Neural Network

3.1. Global Evolutionary Neural Network

3.1.1. General Framework of the EPNN Evolutionary Learning System. The evolutionary learning system of the neural network consists of three interrelated parts, that is, connection right evolution learning mechanism, structure evolution mechanism, and learning rule evolution mechanism. Each part of the learning system has its dependent environment and corresponding evaluation mechanism [14]. Figure 2 shows a general block diagram of an evolutionary system.

3.1.2. Description of the EPNN Evolutionary Learning Algorithm. Considering the interconnection of multiple layers on the front network, assume that X and Y represent the input and output vectors of the network, respectively, yi represent the actual output of the network, and m, N, and n represent the number of devices accessing the network, hidden units, and output units, respectively, I/O correlation between the entry process, hidden layer, and release process can be shown as

$$x_j = X_j,$$
$$x_0 = -1. \tag{1}$$

The above two formulas meet $1 \leq j \leq m$:

$$x_i = f\left(\sum_{j=0}^{i} w_{i,j} x_j\right), \tag{2}$$

where $m < i \leq m + N$,

$$y_i = f\left(\sum_{j=0}^{i} w_{i,j} x_j\right), \tag{3}$$

where $m + N < i \leq m + N + n$.

In the above formula, $W_{i,j}$ represents the offset or threshold of the ith processing unit, and then, there is the following formula

$$f(a_i) = \frac{1}{1 + e^{-a^i \cdot T}} \quad f(\cdot) \in [0, 1]. \tag{4}$$

In the above formula, T represents an adjustable parameter, which is used to adjust the shape of S-type action function.

For all connections to the forward network, it is assumed that m and n represent the number of devices and outputs of the network, respectively, and N represents the hidden numbers. The structure and weight of the network are equal to one person through direct access [15]. The length of each individual is the same, and the number of hidden units contained in the corresponding neural network can be the same or different. This is determined by the state S of each hidden unit in the individual representation.

The fitness of individuals is determined by the connection weight, learning performance, and structural performance of evolutionary networks, expressed as follows:

$$F_i = F_i^S + F_i^E, \tag{5}$$

where F_i^S represents the structural performance index of the ith individual and F_i^E represents the connection weight learning performance index of the ith individual.

In the study, the network and variance are used as the learning performance evaluation of connection weight and the network structure complexity index—the number of hidden units and the number of effective connections are used as the structural evaluation—so as to determine the individual fitness [16], expressed as follows:

$$F_i^E = \text{SSE}(i) = \sum_{p=1}^{p} \sum_{j=1}^{n} \left(Y_i^p - y_{ij}^p\right)^2, \quad F_i^E = N_i^{HN} + N_i^C. \tag{6}$$

League selection is a common strategy in the research of evolutionary optimization function based on EP. In order to ensure the structural diversity in the process of evolution, in the connection weight evolutionary learning, multitrack evolutionary selection is adopted, that is, the new individual generated by mutation only competes with its parent individual, and the one with better performance can survive [17].

In structural evolution learning, the selection rules are as follows. When the fitness performance is equal, individuals with the small structure scale are preferred; for the hidden unit addition variation, only when the structural variation improves the learning performance of weight evolution and can the new individual with better performance replace the individual with the worst performance of its parent, which indicates structural evolution; and for hidden unit deletion variation, only when the structural variation does not reduce the learning performance of weight evolution, and the new individual with better performance will replace the individual with the worst performance of its parent, which indicates structural evolution [18].

In the structural variation, when the hidden unit is added and mutated, the relevant connection weight of the newly added hidden unit is set to zero, and the relevant connection weight of the original hidden unit remains unchanged. When the hidden unit is deleted and mutated, the relevant connection weight of the original hidden unit remains unchanged. The purpose of this is to expect good performance changes between father and son generations before and after structural variation, and the generation gap should be as small as possible [19].

In EPNNA, first, evolutionary learning is carried out for the fully connected forward network, and finally, the learned network is pruned. Structural variation includes three basic operators: hidden unit addition variation, hidden unit deletion variation, and connection pruning variation.

(1) Implicit unit addition variation: after variation, the number of ith individual hidden units in the population is

$$N_i^H(t + 1) = N_i^H(t) + U[1, \Delta_{max}], \tag{7}$$

where Δ_{max} represents the maximum number of hidden units allowed to be added or deleted per structural variation, and $U[1, \Delta_{max}]$ represents the uniformly distributed random number between 1 and Δ_{max}.

(2) Hidden unit deletion variation: after variation, the number of ith individual hidden units in the population is

$$N_i^H(t + 1) = N_i^H(t) - U[1, \Delta_{max}] \quad N_i^H(t + 1) \geq 1. \tag{8}$$

Randomly select $N_i^H(t + 1)$ hidden units from the individual hidden unit queue and delete their related connections in the individual network.

3.2. Connection Pruning Variation.
For the individual network with a satisfactory fitness value, the connection pruning variation is determined according to the number of connections whose connection weight tends to. In the prunable case, each mutation deletes one of the least important connections from the network [20].

When and only when the population evolution stagnates or a satisfactory solution is obtained, the connection weight learning is ended and the process of structural evolution learning is transferred. In the process of structural evolution learning, different structural variations are adopted according to whether a satisfactory solution is obtained [21]. When the satisfactory solution is obtained, the structure
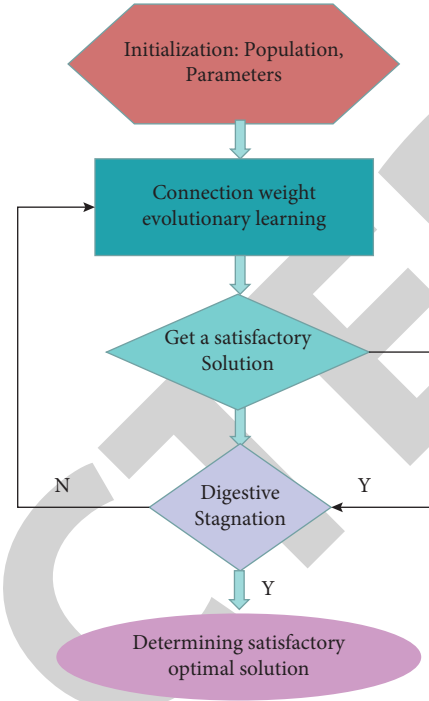
Figure 3: Evolutionary algorithm flow.

pruning mutation is carried out. For the pruned structure network population, the connection weight evolutionary learning is carried out. When the satisfactory solution is not obtained and the evolution is stagnant, the structure growth mutation is carried out. Then, the connection weight evolutionary learning is carried out for the new structure scale network population. When the structure pruning evolution stops, the evolutionary learning process is ended and the satisfactory optimal solution obtained by evolutionary learning is determined [22].

The overall evolutionary neural network process is shown in Figure 3.

The detailed steps of the algorithm are as follows.

(i) Initialize the population, as shown in the following formula:

$$x_t(t) = [W_t, C_i], i = 1, 2, \ldots, N_{POP} \quad t = 0 \, \text{gen} S = 0. \tag{9}$$

(ii) The connection weight learning algorithm process is described in the following algorithm process. If the evolution stagnates or a satisfactory solution is obtained, end the connection right learning and move to the next step 3. Otherwise, continue the connection right learning process.

3.3. Effectiveness Analysis.
For the initial structural network population, if the satisfactory solution is obtained, the structural modification variation and connection weight learning can be carried out. Otherwise, when the satisfactory solution is not obtained, the evolution of connection weight stagnates. It shows that the current population does not have

the structure to obtain satisfactory solutions, and only structural growth variation and connection weight learning can be carried out [23]. For structural growth evolutionary learning, the learning process will end only when a satisfactory solution is obtained. It is worth noting that the structure of the satisfactory solution network obtained at this time is often not satisfactory and optimal. For structural pruning evolutionary learning, when evolution stagnates and a satisfactory solution cannot be obtained, it indicates that the current population does not have the ability to obtain a satisfactory solution. It is determined that the best individual of the population before this pruning is the learning network with the smallest structural scale and the satisfactory optimal solution network.

4. Design of the Student Management System

4.1. System Requirements. From the perspective of system requirements analysis, as an application system to assist student management, this system is mainly aimed at colleges and departments with student management functions and relevant departments with students' comprehensive information needs. Since the management mode of students in our school is school work office ⟶ student management office of colleges and departments ⟶ teachers (mainly head teachers) and the head teachers are the direct managers of class students, some basic data of the student management information system need to be provided by the head teachers [24]. Ordinary teachers are responsible for the input and modification of students' grades. Therefore, the main objects of this system are school management staff, department student management staff, teachers, and students. The system requirements flow is shown in Figure 4.

4.2. System Function Analysis

4.2.1. Function Analysis of the Student Status Subsystem. Through the statistical query of the data in the student files, various data statistical tables can be obtained. The student status management subsystem can manage all information changes of a student during school, such as student status change, punishment and reward management, and graduation management [25]. The data information in the subsystem is uniformly managed by the administrator, who has the authority to effectively manage the basic information, details, punishment, and graduation of students. The business flowchart of the student status subsystem is shown in Figure 5.

4.2.2. Function Analysis of the Course Selection Subsystem. The course selection subsystem is a very important functional module in the college student management system. With reference to the curriculum of this semester offered by the college, all courses are listed. According to the actual situation of individuals and the arrangement of the college, courses are selected and confirmed to be submitted. If the data are legal, that is, the course selection is reasonable, the
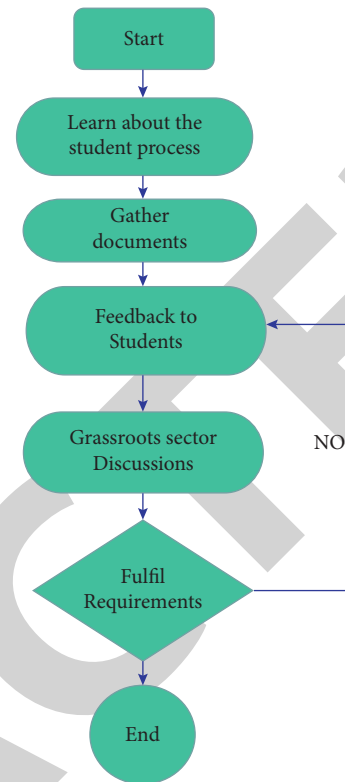
Figure 4: System analysis flowchart.

course selection application is submitted successfully and wait for the subsystem to process the course selection data accordingly. The business flowchart of the course selection subsystem is shown in Figure 6. Otherwise, students can reselect courses and repeat the above course selection process.

4.2.3. Function Analysis of the Score Subsystem. At the end of the semester, teachers can enter the score management subsystem through their own teaching staff number and password and then enter all students' scores in their own teaching class through the score subsystem. Each teacher in the college may have multiple teaching courses or multiple classes, which can be distinguished by class number and course code [26]. Teachers can input students' course score information into the score database. The submission times of scores are specified as one time, but they can be modified many times. To modify scores, teachers need to fill in the modification application and get the approval of the academic affairs office of the school and then authorize teachers to modify scores through educational administration management personnel. The business flowchart of the score subsystem is shown in Figure 7.

4.2.4. Function Analysis of the Curriculum Management Subsystem. At the beginning of each semester, students will choose courses, and administrators and teachers will set up courses, such as which courses need to be set up, which teacher will bring which course, as well as the place, time,
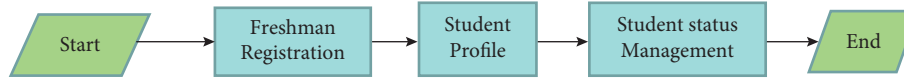
FIGURE 5: Student status business flowchart.
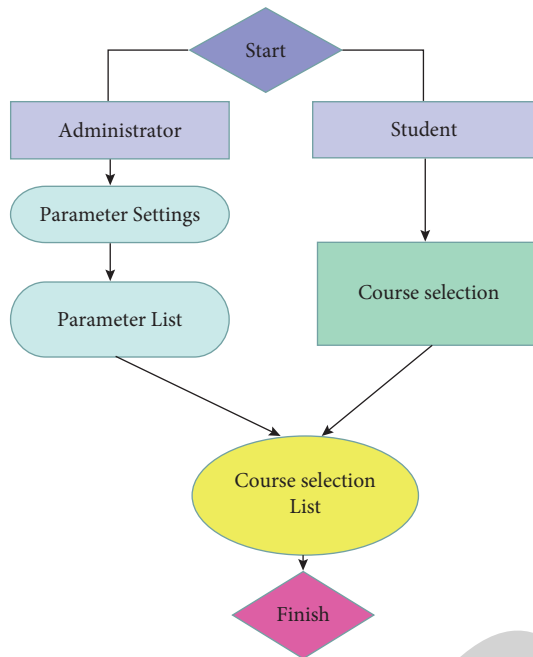
FIGURE 6: Flowchart of course selection.

and course information of the course. The management and maintenance of basic course information, the addition of new courses, the change of course credits, class hours, and elective/compulsory courses are the authorities of the administrator. Maintaining the information of teachers, courses, and classes, students choosing the courses they want to attend, viewing the selected credits and modifying their personal information, and teachers deciding the students to attend classes and giving students credits are the functional scopes of the course management, as shown in Figure 8, which is the functional analysis flowchart of the course management subsystem.

4.3. System UML Analysis

4.3.1. Login Module Use Case Diagram. The use case diagram can well describe the role of the system. The following is the use case design diagram of the login system.

Case name: login system

Participants: administrators, teachers, and students

Objective: to log into the student information management system

Description: enter the user account and password, check the user name and corresponding password information stored in the database, and log in only after successful verification by the system. The system enables the user to enter the corresponding operation interface according to the user authority. If the account

or password is entered incorrectly, a corresponding prompt will be generated, then exit the system and log in again. The use case diagram of login module is shown in Figure 9.

4.3.2. Administrator Module Use Case Diagram. This system completes student information management, so the administrator in this system is mainly responsible for student information management, including adding, editing (deleting and modifying), and querying student information. The administrator manages student status information, student course information, and student achievement information. You can query, modify, and delete students' student status information, view students' selected courses, add and delete courses, view students' grades, and add and modify students' grades, as shown in Figure 10.

4.3.3. Teacher Module Use Case Diagram. After logging into the system, teachers can manage all the information of their students, including basic information, reward and punishment information, achievement information, conduct evaluation information, course information, and so on. In addition, you can query the above data, as shown in Figure 11.

4.3.4. Student Module Use Case Diagram. Student number is the only sign of students in school. After logging into the system with student number and password, students can query their own information, such as natural basic information, achievement information, reward information, punishment information, and course information, as shown in Figure 12.

4.4. System Function Module. It mainly includes the main management modules of student management, such as student information management, curriculum management, and performance management. The main functional modules completed by the system are shown in Figure 13.

System modification record refers to the modification of data records. First, after logging into the system, the user can check whether he has the permission to modify records. If he has the permission to modify records, it is allowed to query whether there are duplicate records in the database. For example, to modify a student's information in the system, first ask the database for the existence of the student through the student number. If so, the user is allowed to modify the data into the database and return to the successful modification interface. If it is found that the student number of the student does not exist in the system, the system fails to modify the record of the student information [27]. The

FIGURE 7: Performance management business flowchart.
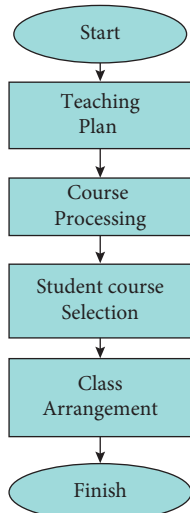
FIGURE 8: Flowchart of the course arrangement.
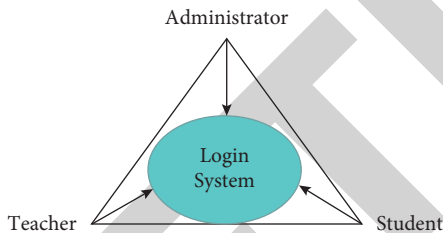
FIGURE 9: Login module use case diagram.
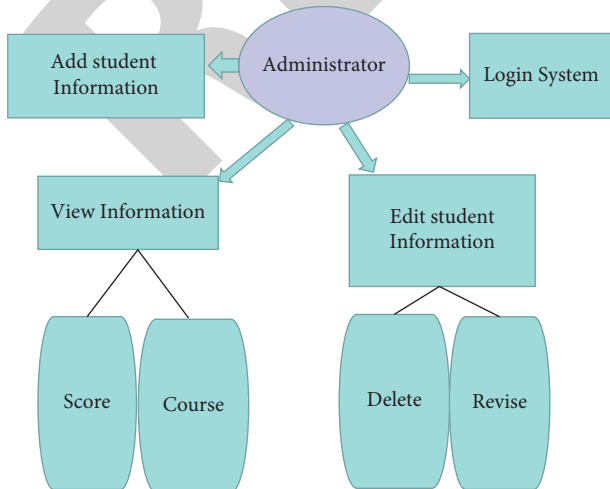
FIGURE 10: Admin module use case diagram.
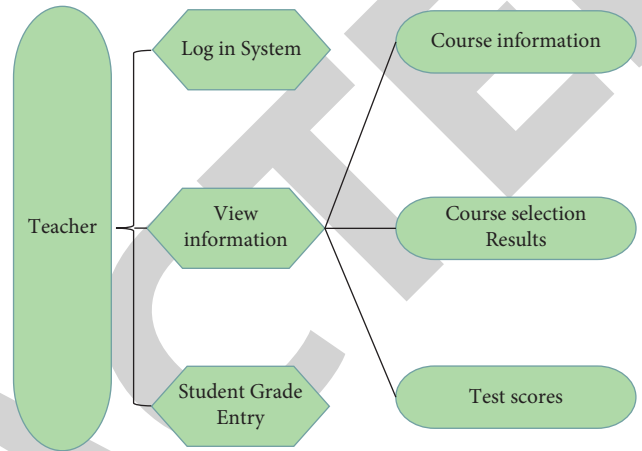
FIGURE 11: Use case diagram of teacher management module.
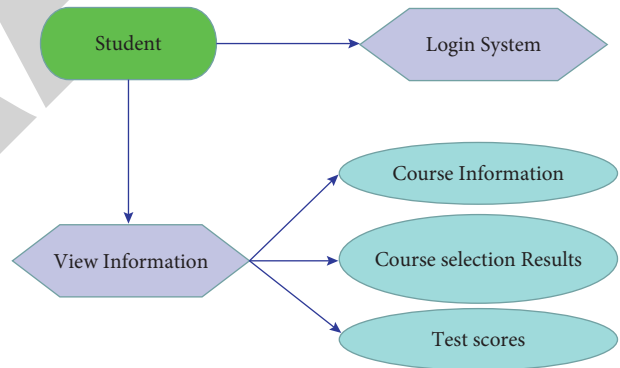
FIGURE 12: Use case diagram of student management module.
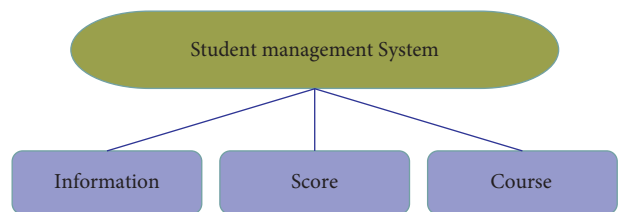
FIGURE 13: System function module diagram.

process design of adding and modifying records in the system is shown in Figures 14 and 15.

System management is a module for managers to set permissions for users. Managers have the highest permissions and have all permissions on the system. The process design of system management is shown in Figure 16. First, after the login module, the system judges the user's
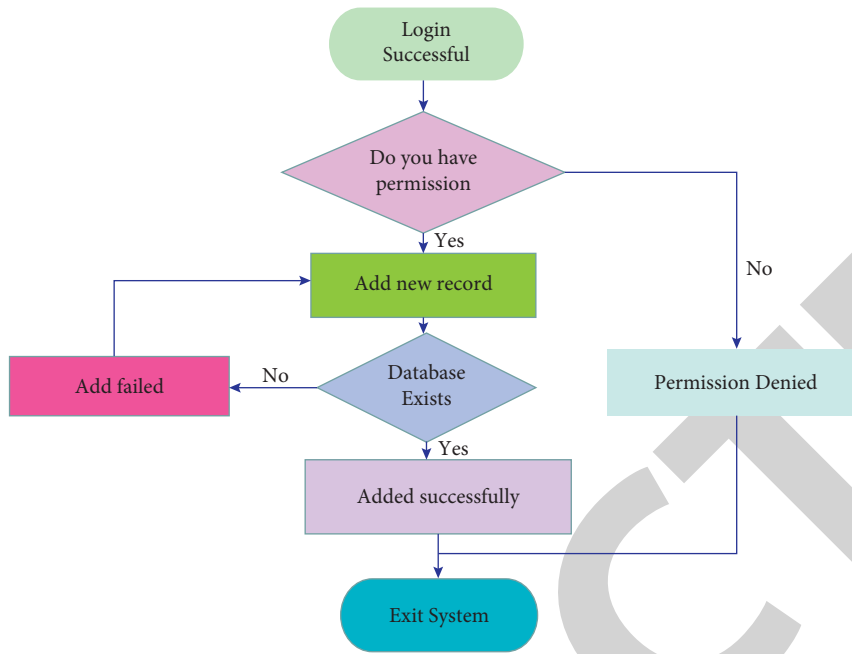
FIGURE 14: Flowchart of adding record module.
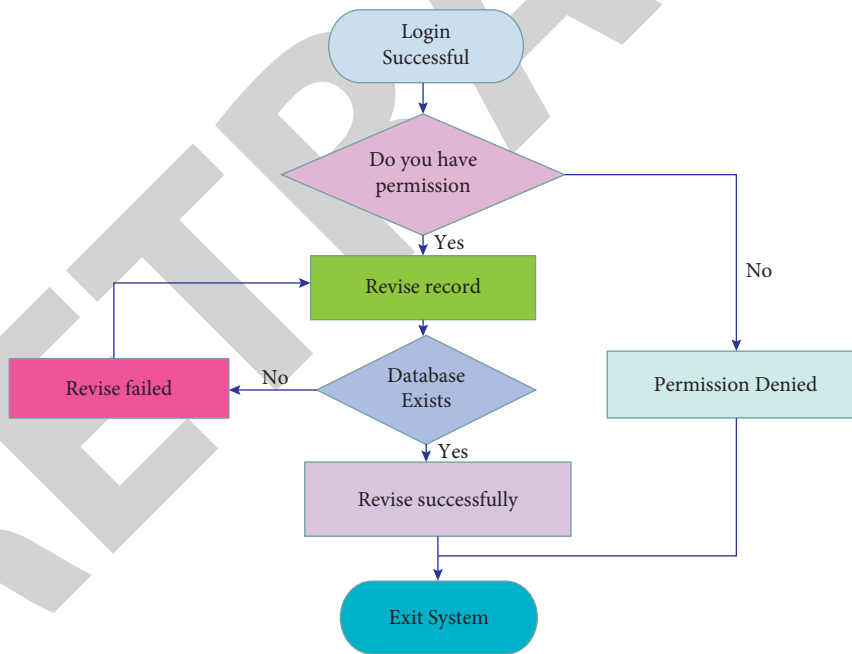
FIGURE 15: Flowchart of modification record module.
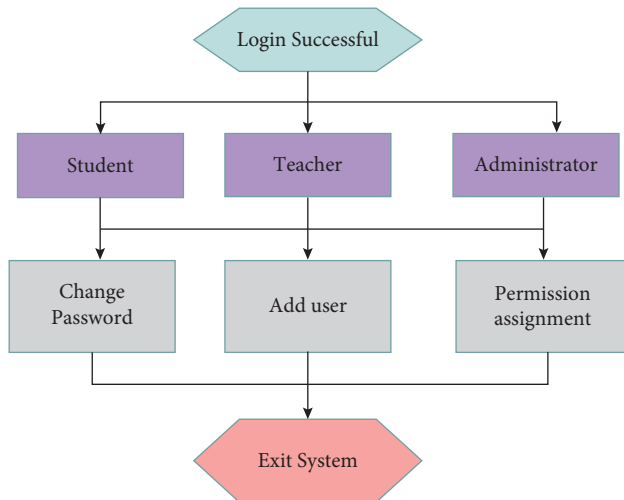
Figure 16: Flowchart of system management module.

permission according to the login record and assigns it to the corresponding operation of the user with the corresponding permission.

5. Effective Methods of Ideological and Political Work in the Internet+ Era

5.1. Existing Problems and Challenges of Ideological and Political Work in Colleges and Universities

5.1.1. Traditional Problems and Challenges. (1) Thoughts and politics are dogmatic and difficult to adapt to new situations and changes in the new environment: at present, the method of ideological and political work has not completely got rid of the way of preaching. It is lack of innovation and difficulty to attract students. In the Internet+ era, students have been fully exposed to various external ideas and concepts, and there has been a trend of diversification. It is the responsibility of our ideological and political teachers in colleges and universities to guide college students to consciously maintain consistency in the main theme, promote positive energy, and identify those ideas that run counter to the main theme. However, if the working methods follow dogmatism and teach students through orders and preaching, it will be difficult to tell wonderful things. If students cannot listen, they cannot achieve the effect of education.

(2) Emphasis on academic performance, light ideological and political education, and lack of easiness to operate students' ideological and political assessment standards: in some cases, the ranking and measurement of student achievement in various awards are very rigorous and important. Students' ideological and political research is difficult; they do not pay attention to personal moral cultivation and do not strengthen ideological and political education and politics, and the operational measures of students' "ideological and political morality" are weak. As a result, some students only pay attention to professional learning and do not pay attention to personal ideological and political learning and moral cultivation.

5.1.2. New Problems and Challenges in the Internet+ Era. (1) The ideological constraints of college students in the virtual world are weakened and easy to be affected by bad thoughts: the biggest difference between the Internet era and the non-Internet era is that in the latter, people's life circle is mainly acquaintances, and the behavior of college students mainly depends on the supervision of acquaintances, surrounding people and social public opinion and their inner beliefs. In the virtual world in the Internet+ era, on the one hand, without "acquaintances and people around," everyone can be anonymous and unknown, which is easy to create the illusion that everyone does not know me. Therefore, it is difficult for acquaintances and public opinion to supervise. They mainly rely on their inner beliefs to supervise their behavior, which may lead to the weakening of college students' self-discipline. On the other hand, for college students, using the Internet has become a common way of life for college students. While the Internet brings all kinds of convenience, it also greatly affects their values, outlook on life, and world outlook. If students are influenced by bad thoughts, they may lead to all kinds of bad behaviors of some college students with poor self-discipline, which will harm all aspects. These new problems put forward new requirements for ideological and political education.

(2) In the real world, college students' face-to-face communication ability deteriorates: the life of contemporary college students is inseparable from the network. Many exchanges rely on various chat softwares. Some college students are easy to indulge in the virtual world of the network for a long time. Face-to-face communication between people is becoming less and less, which has become a common phenomenon among college students.

5.2. Effective Methods of Ideological and Political Work in the Internet+ Era. In view of the above problems and challenges, we must adopt scientific and effective new methods.

5.2.1. Overcome Preaching and Use Students' Favorite Online Social Tools to Innovate Methods. "In order to function well in the thinking and politics of colleges and universities, we need to adapt to changing circumstances, progress over time, and innovate accordingly in the situation." Now, college students get information from the Internet more than ever before. On the other hand, the network is designed and accelerated, so that college students will be able to know all the information in real time through the Internet. Some bad information will have an adverse effect on the thinking of college students, which requires us to pay close attention to the hot data on the Internet and the bad information that boys may encounter and respond and share in a timely manner [28]. On the other hand, college students rely on social networking every day. They should give full play to the

role of the network, actively communicate with them, understand and find problems in time, and dredge and solve them.

5.2.2. Constructing a New Measurement Method of Paying Equal Attention to Academic Achievement and Ideological and Political Work. Establish a comprehensive scientific standard or measurement to evaluate students' ideological and moral character. This measurement can not only quantify the quality of students in all aspects but also have the characteristics of easy operation. At the same time, the measurement of emotional and political and academic performance has been incorporated into the new measurement model, and the performance of the students has been extensively measured and researched on the purpose.

5.2.3. Occupy the Dominance of Internet Discourse and Spread Positive Energy. In response to the negative impact that some of the ideas on the Internet can have on college students, on the one hand, educators and politicians need to pay close attention to collaborate in real time and spread the word more in purpose and work in the management of public opinion online through the use of social platforms frequently. On the other hand, we should also take the initiative to use social software to maintain regular and timely communication with students; understand the latest ideological trends, hobbies, and habits of students; pay attention to students' learning status; solve problems encountered in students' study and life; and care for students. By allowing students to participate in the production of small online videos with positive energy, online consultation, online interaction, smart classroom, and other ways, use the Internet to improve students' interest and enthusiasm in participating in ideological and political education, carry out rich and colorful educational publicity activities, and strive to be students' bosom friends and life mentors.

5.2.4. Effective Use of Web-Based Technology and Management Platforms. Educators work through a web-based management platform, freeing them from many cumbersome approval processes and reducing waste of documents, paper, and other materials. At the same time, educators have more experience to devote to teaching and learning. In the past, reference materials, extra reading materials, and practice questions could be made available to students through online channels, that is, they could be easily accessed at any time and kept for a long time, reducing excessive waste of paper. For examinations, they can also be made available in an online format, increasing the speed of marking, reducing the amount of paper used for examinations, saving energy, and reducing carbon. On the other hand, students become aware of the importance of environmental protection during their studies and are implicitly involved in environmental activities.

6. Conclusion

Starting from the real needs of the system, this research is developed from software engineering concepts and network development and recognizes a way that is not only appropriate for nature but the current set of student data management also provides full play to the advantages of the net development framework and adheres to the development mode of web application systems, which are widely used. Based on the design and implementation, an example is used to test and analyze. First, through the analysis of the educational administration process of colleges and universities, the basic requirements for realizing the system are obtained. On this basis, the daily student information management business is analyzed, and the student information management system is designed according to the analysis results, which can help students, managers, and teachers manage information efficiently. The implementation of this website based on ASPNET technology environment has the advantages of openness, high performance, security, and low cost. Under the guidance of software engineering strategies, we use state-of-the-art technology to integrate system management and independence, giving full play to the quality of the network in data management and improving the operational efficiency of the system. At the same time, the system has mobility and versatility, which will help improve the performance of the students' information management system. As a case management system for undergraduate students, student management, especially the refinement of thought and politics, must be integrated with the background of the "Internet+" era and the frequent responses to the challenges brought by it. Develop a "Internet+" concept, effectively use the Internet platform to work on the management of thought and politics in colleges and universities, patiently learn, full use and develop state-of-the-art technology, hold on to ideas in online thought management and political education in a timely manner, and continue to expand the workplace to complete buildings college and university. To improve governance performance, ensure that the cultural and political administration in colleges and universities is in place, ensure that strongly promotes the achievement of cultural and economic excellence in colleges and universities, and ensure that these activities are always present in all race and demand from the state and community. Learn and apply the spirit of the National Conference on Ideological and Political Work in Colleges and Universities to highlight the importance of thought and politics in colleges and universities and introduce the guidance for the work of theoretical and political educators in colleges and universities. In light of the current state of the Internet+ era, this study presents the uniqueness and importance of the ideological and political work in colleges and universities of medicine, examines issues and problems encountered by thought and politics in colleges and universities in the Internet+ era, and adds procedures to address issues and problems.

Data Availability

The dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

Analysis of Marine Economic Development and Innovation under Environment Constraint Based on the VAR Model

Danjie Wu [ID]

Fujian Jiangxia University, Fuzhou 350108, China

Correspondence should be addressed to Danjie Wu; 2002001@fjjxu.edu.cn

Building a new development pattern based on the "double-cycle" is a major strategic plan of China. Under the background of the new development pattern of the "double-cycle" and the context of environmental constraints, this paper tries to explore the impact of marine economic development on marine cultural industry and marine innovation development, the extent of the impact of marine cultural industry on marine economic growth, and the internal relationship between them under the new development pattern of double circulation. In this paper, Fujian Province is taken as the research object to construct an indicator system of the marine culture development to reflect the living standard, employment level, and spiritual and cultural levels of people in the marine area, and the external influence of the marine economy and marine culture industry is taken as the indicator variable to measure the integrated development. The internal changes are regarded as the index to assess the integration level of the two, and the evaluation theoretical model of the dynamic evolution level of the marine economy and marine cultural industry is constructed. The vector autoregression model and impulse response function are used to study the interactive correlation between the growth of the marine economy and the development of the cultural industry. The results show the following: In the long run, there is a cointegration relationship between the marine culture industry and the gross ocean product (GOP), which is a long-term balanced and stable relationship. The development level of the marine economy and the development of marine culture industry are mutually influencing and promoting.

1. Introduction

China's gross marine product increased from 6,969.4 billion yuan in 2016 to 8001 billion yuan in 2020. Except for coastal tourism, the marine industry has recovered rapidly and steadily, its scale has continued to expand, and the added value of the industry has bucked the trend. The report to the 19th CPC National Congress said China's economy has shifted to a stage of high-quality development and must adhere to the "five development concepts" and the goal of building a maritime power. The outline of the 14th Five-year Plan, which will be issued in March 2021, clearly states that important plans will be made for the development of marine undertakings from a strategic perspective, and calls for building China into a maritime power and expanding the space for the development of the marine economy. In 2015, the State Oceanic Administration designated the "West

Coast of the Straits" as one of China's five marine cultural circles. "Fujian on the Sea" is China's first local documentary on marine topics, and fully demonstrates resource endowment and distinctive cultural deposits of "Fujian on the Sea." "Fujian Volume of Chinese Marine Culture" calls Fujian traditional shipbuilding and navigation technology "The fifth great invention of China," and calls Fujian people "the most marine ethnic group in China" and praises Fujian maritime merchants as "no empire." Fujian marine culture has a top position in the history of Chinese marine culture. During the 13th Five-Year Plan period, Fujian province also proposed that Fujian province should accelerate the construction of emerging industries such as the marine culture industry, coastal tourism, marine sports, leisure industry, sea-related financial service industry, and constantly improve the competitiveness of the marine economy. In 2021, the action plan of "Fujian On the Sea" will promote the

marine culture industry to become a "sunrise industry." In this context, this paper tries to explore the impact of marine economic development on marine cultural industry, the extent of impact of marine cultural industry on marine economic growth, and the internal relationship between them under the new development pattern of double circulation. The answers to these questions will provide a theoretical basis for the government to formulate effective policies and have a practical significance for the high-quality development of the marine economy.

2. Literature Review

American economist Gerald J. Mangon (1982) first proposed the concept of "marine economy" in American Ocean Policy. Charles believes that "marine economy is an economic activity that takes marine resources as an input" [1]. Some scholar believes that "marine economy refers to economic activities that provide products and services, and part of the value of these products and services is determined by the ocean or its resources." This paper analyzes the current situation of the development of the marine economy in the United States and puts forward some countermeasures. Rochwulaningsih et al. by listing examples of the rapid development of marine economy in Indonesia through the dissemination of marine culture and maritime trade in history, believe that the Indonesian government should rebuild marine culture and formulate a comprehensive marine economy development strategy to reflect prominent marine characteristics [2]. From the perspective of the ecosystem, Winther et al. proposed the IOM method to integrate and balance different marine uses, optimize the marine economy as a whole, and achieve sustainable development [3]. Lubchenco et al. proposed five countermeasures to promote the sustainable development of the marine economy from the perspectives of climate change, marine fishing, and biodiversity [4]. China began to study the marine economy in the 1980s. Although it was much later than foreign countries, after years of exploration and development, domestic scholars have also conducted a large number of studies on the marine economy and marine culture from various perspectives. Solow internalized labor productivity and initiated the study of long-term economic growth from the perspective of supply [5]. Subsequently, Lucas internalized human capital [6], Romer [7], and Grossman et al. internalized technological progress as the source of economic growth [8–10]. Furthermore, Nadiri found that technological progress is the result of enterprise R&D, which can explain almost half of the total factor productivity growth [11]. Based on this, some scholars also considered the influence of knowledge spillover effect on economic growth. Different from previous studies, Acemoglu no longer regarded technological progress as endogenous [11], and proposed a technology-biased endogenous economic growth model based on the Dixit-Stiglitz model (Dixit et al.), which has been widely promoted [12]. Biased technological progress means that if the output change brought by the input of the factor is greater than the change of the input [13–15], then the technology progress is biased to the factor [16]. In reality, technology progress is usually biased. With the deterioration of the global environment, more and more scholars consider the impact of resources and the environment on economic growth. With the development of China's marine economy, the pressure on the marine ecological environment gradually increases [17]. From the perspective of research objects, existing scholars' studies mainly include marine fisheries [17] and port technical efficiency [18]. Levinsohn-Petrin (LP) method is adopted by mathematicians to study marine economic efficiency. In the field of the marine economy, based on the super-efficiency DEA (SE-SBM) and the Generalized Method of Moments (GMM) model, Zheng et al. found that in a certain period, Capital input and scientific and technological innovation have a negative effect on marine economic efficiency [19].

Based on the above literature research, it can be seen that as a new industry combining marine economy and culture, the marine cultural industry has a promising development prospect. Existing literature confirms that the marine culture and marine economy can influence each other, and most scholars analyze them from the perspective of marine culture and marine economy. However, few studies focus on the marine cultural industry, especially the lack of empirical analysis on the internal correlation between the marine culture industry and the marine economy. In view of this, drawing on previous experience, this paper aims to deeply analyze the long-term dynamic equilibrium relationship between the growth of the marine economy and the development of the marine culture industry in Fujian Province. Through the stability test and cointegration test of variables, the vector autoregressive model is constructed to test the endogenous interaction relationship between the marine culture industry and the development of the marine economy.

3. Empirical Analysis

3.1. Variable Selection. To objectively and comprehensively measure the marine economy and marine culture industry development level, fully consider the development of Fujian coastal areas, from the Marine industry development level, export trade development level, and infrastructure development level three dimensions to describe the development of marine economy, choose gross ocean product (GOP) represents marine industry development level, import and export total (MEV) represents import and export trade development level, total fixed assets investment (FAI) represents infrastructure development level. From the marine area, people's living standards, people's employment level, people's spiritual culture level three dimensions to depict marine culture industry development level, urban residents' disposable income level (UPDI) on behalf of marine area people's living standards, the third industry employees (TIE) on behalf of marine people's employment level, books published (BP) represents the marine area people's spiritual culture level. To sum up, the specific descriptions of the marine economy and marine culture industry development index variables are shown in Table 1.

TABLE 1: Definition of indicator variables of marine economy and marine cultural industry development.

Variable name	Indicators of marine economic development			Indicators of marine culture industry development		
	Gross ocean product (X1)	Total imports and exports (X2)	Total imports and exports (X2)	Disposable income of urban residents (X4)	Number of tertiary industry employees(X5)	Total number of books published (BP) (X6)
Variable abbreviation	GOP	MEV	FAI	UPDI	TIE	BP
Variable unit	100 million yuan	100 million dollars	100 million yuan	1 yuan	10000 people	10000 copies
Variable meaning	The development level of sea-related industries	Level of development of import and export trade	Level of infrastructure development	Living standards in marine areas	The employment level of people in maritime areas	The spiritual and cultural level of people in maritime areas
Variable source	China oceanic statistical yearbook China marine economic development report	Fujian statistical yearbook 2020	Fujian statistical yearbook 2020	Fujian statistical yearbook 2020	Fujian statistical yearbook 2020	Fujian statistical yearbook 2020

3.2. Data Sources.

The data of all indicators are from Fujian Statistical Yearbook, China Marine Statistical Yearbook, China Marine Economic Development Report, etc. The detailed original data are shown in Table 2.

3.3. Empirical Research on the Relationship between Marine Cultural Industry and Marine Economy Based on Pillar Industry Indicators

3.3.1. Proportion of Marine Cultural Industry in Gross Marine Product.

Generally speaking, the industry that accounts for a significant proportion of the economic aggregate in a certain field will have an impact on the economic development of the field. To facilitate comparison, this paper lists the proportion of the marine culture industry, maritime transportation industry, and marine fishery in the total marine GDP from 2010 to 2021, as shown in Table 2. Different from the continuous decline of marine traffic and fisheries, the marine culture industry has an overall growth trend and will account for about 1/5 of the gross marine product by 2021, exceeding the requirement of 5% as a pillar.

3.3.2. Elasticity of Income Demand of China's Marine Culture Industry.

The elasticity of demand income refers to the ratio of the increase rate of demand for a certain industrial product to the increase rate of per capita national income. If the elasticity of demand income is greater than 1, it indicates that within the increase of income, demand grows faster than income. Obviously, with the growth of per capita national income, selecting industries with high elasticity of demand income conforms to the law of the market, which is conducive to the evolution of industrial structure and has a great impact on the economy. Since there is no concept of per capita GROSS marine Product, this paper selects the increase of the Marine cultural industry and per capita GROSS Marine product from 2010 to 2021 to calculate the elasticity of demand income. The data in Table 3 were obtained through formula calculation.

TABLE 2: The percentage of ocean culture industry ocean transportation and marine fishery.

Years	Marine culture industry	Transportation	Fisheries
2009	16.09	13.83	10.15
2010	19.31	13.37	9.68
2011	13.22	14.66	9.58
2012	14.83	13.85	8.67
2013	16.27	13.44	8.54
2014	17.33	11.72	7.74
2015	17.99	11.85	7.44
2016	18.11	11.78	7.5
2017	19.26	9.75	7.56
2018	19.14	9.57	7.21
2019	19.59	8.7	7.22
2020	19.89	9.59	7.29

3.3.3. Elasticity Analysis of Sea-Related Employment.

Elasticity of employment refers to the rate of employment growth caused by each additional unit of the economy under the condition that other factors remain unchanged. If the elasticity of employment is greater than 1, it indicates that the employment capacity brought by economic growth is large and the development of this industry can drive employment and stimulate economic growth. This paper selects the statistical data of marine-related employment from 2015 to 2020 and the added value of the marine cultural industry as the basis for calculating the elasticity of employment. According to the data in Table 4 obtained through formula calculation, although China's marine cultural industry continues to grow, the elasticity of sea-related employment in China is far less than 1, which means that the increase in China's marine cultural industry cannot drive the increase of sea-related employment.

3.4. ADF Unit Root Test.

ADF (Augmented Dickey-Fuller) test can be used to test the stationarity of time series. If it is not stable, it is necessary to eliminate the unit root by difference, so that the time series can reach the same order integration, and then continue the subsequent tests. The unit

TABLE 3: Ocean culture industry income elasticity of demand.

Year	Marine culture industry		Per capita GDP		Income elasticity of demand
	Output value (hundred million Rmb)	The growth rate (%)	GDP (RMB)	Appreciation (%)	
2012	2174.29	37.64	12336	17.02	2.21
2013	2872.29	32.1	14185	14.99	2.14
2014	3742.29	30.29	16500	16.32	1.86
2015	4608.29	23.14	20169	22.24	1.04
2016	5380.57	16.76	23708	17.55	0.96
2017	6217.57	15.56	25608	8.01	1.94
2018	7575.86	21.85	30015	17.21	1.27
2019	8914.14	17.67	35181	17.21	1.03
2020	9960	11.73	37195	5.72	2.05

TABLE 4: Ocean-Related employment elasticity.

Year	Number of sea-related jobs nationwide		Marine culture industry		Elasticity of employment
	People (10000)	Appreciation (%)	Production value	Appreciation (%)	
2015	2960.3	6.45	870	30.29	0.21
2016	3151.3	6.45	866	23.14	0.28
2017	3218.3	2.13	772.29	16.76	0.13
2018	3270.6	1.63	837	15.56	0.1
2019	3350.8	2.45	1358.2	21.85	0.11
2020	3421.2	2.1	1338.29	17.67	0.12

root test ADF method was used to conduct unit root test on gross ocean product (GOP), total import and export (MEV), total fixed investment (FAI), urban residents' disposable income level (UPDI), number of tertiary industry employees (TIE) and total books published (BP). The specific test results are shown in Table 5.

As can be seen from the unit root test results in Table 6, the original time series of gross ocean product (GOP), total import and export volume (MEV), urban residents' disposable income level (UPDI) and total books published (BP) are all unstable. After the first-order difference, gross ocean product (GOP) and total fixed investment (FAI) are still unstable. All other variables are stationary. After the second-order difference between gross ocean product (GOP) and total fixed investment (FAI), other variables except for total import and export (MEV) and total fixed investment (FAI) are in a stable state. Here, total import and export (MEV) and total fixed investment (FAI) are excluded, and gross ocean product (GOP) is simplified to represent the development level of the marine economy.

3.5. Co-Integration Test.
Taking gross ocean product (GOP) as an explanatory variable, urban residents' disposable income level (UPDI), number of tertiary industry employees (TIE), and the total number of books published (BP) as explanatory variables, a cointegration test was conducted. The residual sequence equation and cointegration test results are shown in Tables 7 and 8.

As can be seen from Table 5, there is a cointegration relationship between the number of tertiary industry employees (TIE) and the total number of books published (BP), and there is a long-term correlation between GOP, TIE, and BP. Granger causality test can be continued, to further explore the causal relationship between these endogenous variables.

3.6. Granger Causality Test.
The stability of the VAR model should be checked before the Granger causality test to avoid false regression.

$$y_i = \sum_{i-1}^{q} \alpha_i x_{t-i} + \sum_{j-1}^{q} \beta_j y_{t-j} + u_{1t}^4, \tag{1}$$

$$x_i = \sum_{i-1}^{s} \lambda_i x_{t-i} + \sum_{j-1}^{s} \delta_j y_{t-j} + u_{2t}^4. \tag{2}$$

From the above formula, we can judge the relationship between x and y in the Granger causality test. Before the Granger causality test, VAR modeling should be carried out. The modeling data of the VAR model are shown in Table 9.

It can be evaluated from Table 10 that the VAR selects 4-order lag order. The significance level of the Granger causality test is set as 10%. When the P value of the Granger causality test is less than the significance level, it is proved that the explanatory variable is the Granger Number of the explained variable. The results of the Granger causality test are shown in Tables 11 and 12.

It can be found from Tables 11 and 12 that, firstly, when the explained variable is gross ocean product (GOP), urban residents' disposable income level (UPDI) is the Granger cause of GOP; The number of tertiary industry employees (TIE) and the total number of books published (BP) is not the Granger reason for the gross ocean product (GOP). Secondly, when the explained variable is urban residents' disposable income level (UPDI), gross ocean product (GOP) is the Granger cause of urban residents' disposable income

TABLE 5: Table of raw data.

Year	Indicators of marine economic development			Indicators of marine culture industry development		
	X1 GOP	X2 MEV	X3 FAI	X4 UPDI	X5 TIE	X6 BP
1990	130.6	43.39	90.51	1749	284.34	16312
1991	154.9	57.48	117.28	1953	306.14	17667
1992	196.2	80.59	193.21	2351	324.92	19399
1993	278.6	100.42	320.45	2923	356.64	17044
1994	411.1	121.9	472.49	3935	386.67	19745
1995	523.7	144.46	594.45	4853	407.98	18448
1996	621.1	155.2	696.91	5574	424	21348
1997	717.7	179.53	794.33	6144	433.34	23282
1998	789.9	171.61	941.25	6486	445.56	21596
1999	853.5	176.2	952.22	6860	452.22	21875
2000	941.1	212.23	995.38	7432	476.71	20298
2001	1018.2	226.26	1053.84	8313	489.94	17891
2002	1116.9	283.99	1148.76	9189	499.58	19953
2003	1249.9	353.26	1411.45	10000	523.6	15595
2004	1428.0	475.27	1789.38	11175	551.55	13907
2005	1603.9	544.11	2241.70	12321	583.69	10643
2006	1867.1	626.59	2998.45	13753	616.43	9840
2007	2290.3	744.51	4186.67	15505	649.79	8463
2008	2688.2	848.21	5148.31	17961	692.24	7793
2009	3201.9	796.49	6180.94	19577	754.55	7689
2010	3682.9	1087.8	8067.33	21781	784.16	7749
2011	4284	1435.22	9885.67	24907	883.66	8294
2012	4482.8	1559.38	12452.24	28055	929.95	9078
2013	5028	1693.22	15245.24	28174	940.56	8870
2014	5980.2	1774.08	18141.37	30722	1021.04	8619
2015	7075.6	1688.46	21300.91	33275	1124.84	8800
2016	7999.7	1568.19	23107.49	36014	1175.39	9709
2017	8460.61	1710.35	26226.6	39001	1199.56	10809
2018	9671.9	1875.76	29400.1	42121	1224.15	11461
2019	10598.8	1930.86	31164.1	45620	1322.76	14385

TABLE 6: ADF unit root test results.

Variable	The ADF statistics	1% critical value	5% critical value	10% critical value	P value	Conclusion
GOP	−0.167666	−4.440739	−3.632896	−3.254671	0.9895	Nonstationary
1	−0.806893	−4.440739	−3.632896	−3.254671	0.9494	Nonstationary
2	−3.795812	−3.78803	−3.012363	−2.646119	0.0098	Stationary
MEV	−2.108362	−4.323979	−3.580623	−3.225334	0.5191	Nonstationary
1	−3.432349	−3.689194	−2.971853	−2.625121	0.0182	Stationary
2	−3.565382	−4.440739	−3.632896	−3.254671	0.0262	Nonstationary
FAI	−3.705701	−4.440739	−3.632896	−3.254671	0.0435	Stationary
1	−2.444314	−4.467895	−3.644963	−3.261452	0.3488	Nonstationary
2	−1.537274	−2.653401	−1.953858	−1.609571	0	Nonstationary
UPDI	1.085927	−4.309824	−3.574244	−3.221728	0.9998	Nonstationary
1	−4.656108	−4.323979	−3.580623	−3.225334	0.0046	Stationary
2	−5.227024	−4.374307	−3.603202	−3.238054	0.0015	Stationary
TIE	−3.644226	−4.416345	−3.622033	−3.248592	0.0479	Stationary
1	−4.961781	−4.33933	−3.587527	−3.22923	0.0024	Stationary
2	−5.270766	−3.737853	−2.991878	−2.635542	0.0003	Stationary
BP	−1.007396	−4.309824	−3.574244	−3.221728	0.9274	Nonstationary
1	−4.998777	−4.323979	−3.580623	−3.225334	0.0021	Stationary
2	−7.1565	−4.356068	−3.595026	−3.233456	0	Stationary

Table 7: Residual sequence equation.

$y = -845.3336 + 0.230464 \times 4 + e$		$T = (-5.715153) \ (32.85507)$	
R-squared	0.974717	Durbin-Watson stat	0.211102
$y = -3609.563 + 9.75216 \times 5 + e$		$T = (-14.04658) \ (28.14606)$	
R-squared	0.965862	Durbin-Watson stat	0.199081
$y = 7854.884 - 0.342973 \times 6 + e$		$T = (5.809431) \ (-3.840637)$	
R-squared	0.345037	Durbin-Watson stat	0.112765

Table 8: Co-integration test table.

Variable	The ADF statistics	P value	1% critical value	5% critical value	10% critical value	Conclusion	Whether cointegration or not
e1	−0.745693	0.3783	−2.708094	−1.962813	−1.606129	Nonstationary	NO
e2	−2.153314	0.034	−2.717511	−1.964418	−1.605603	Stationary	YES
e3	−2.337891	0.0229	−2.717511	−1.964418	−1.605603	Stationary	YES

Table 9: Data table of the VAR model modeling.

	DDX1	DDX4	DDX5	DDX6
	− 0.513044	2.132396	0.093531	3.942955
DDX1(− 1)	− 0.29548	− 0.84005	− 0.02559	− 2.22456
	[− 1.73632]	[2.53842]	[3.65433]	[1.77246]
	0.108172	3.281957	0.003807	3.648091
DDX1(− 2)	− 0.57236	− 1.62723	− 0.04958	− 4.30913
	[0.18899]	[2.01689]	[0.07678]	[0.84660]
	− 0.079658	− 0.505913	0.004796	1.127483
DDX4(− 1)	−0.08635	− 0.24549	− 0.00748	− 0.65009
	[− 0.92251]	[− 2.06082]	[0.64126]	[1.73434]
	− 0.064841	0.154699	− 0.009926	1.311395
DDX4(− 2)	− 0.09473	− 0.26933	− 0.00821	− 0.71323
	[− 0.68445]	[0.57438]	[− 1.20955]	[1.83868]
	− 0.900965	− 9.323938	− 0.863149	− 36.79936
DDX5(− 1)	− 3.16212	−8.98995	− 0.27391	− 23.8066
	[− 0.28492]	[− 1.03715]	[− 3.15126]	[− 1.54577]
	− 2.828118	− 25.25666	− 0.384216	− 27.77185
DDX5(− 2)	− 3.68634	− 10.4803	− 0.31931	− 27.7533
	[− 0.76719]	[− 2.40991]	[−1.20325]	[− 1.00067]
	− 0.004557	− 0.047359	− 0.001363	− 1.107571
DDX6(− 1)	−0.02578	− 0.07331	− 0.00223	− 0.19412
	[− 0.17672]	[− 0.64605]	[− 0.61047]	[−5.70553]
	− 0.007529	− 0.054228	− 0.000883	− 0.481722
DDX6(− 2)	− 0.02635	− 0.0749	− 0.00228	− 0.19835
	[− 0.28576]	[− 0.72398]	[− 0.38698]	[− 2.42864]
	69.22711	− 0.19971	− 0.977217	− 334.0393
C	− 53.4736	− 152.026	− 4.63193	− 402.585
	[1.29460]	[0.00131]	[− 0.21097]	[− 0.82974]

Table 10: Table of lagging orders.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	−694.6564	NA	2.27E + 20	58.22137	58.41771	58.27346
1	−661.899	51.86593*	5.75E + 19	56.82492	57.80663	57.08537
2	−645.9779	19.90145	6.58E + 19	56.83149	58.59857	57.3003
3	−619.5644	24.21237	3.98E + 19	55.9637	58.51615	56.64086
4	−575.3092	25.81553	9.16e + 18*	53.60910*	56.94692*	54.49462*

level (UPDI). Thirdly, when the explained variable is the number of tertiary industry employees (TIE), gross ocean product (GOP) is also the Granger cause of the number of tertiary industry employees (TIE). Fourthly, when the explanatory variable is the total number of books published (BP), the gross ocean product (GOP) is the Granger cause of the total number of books published (BP). To sum up, the development level of the marine economy is the Granger

TABLE 11: Granger causality test table.

Dependent variable: DDX1			
Excluded	Chi-sq	Df	Prob.
DDX4	11.47044	4	0.0218
DDX5	6.089166	4	0.1926
DDX6	2.708171	4	0.6078
All	47.38088	12	0
Dependent variable: DDX4			
Excluded	Chi-sq	Df	Prob.
DDX1	18.52228	4	0.001
DDX5	4.408588	4	0.3535
DDX6	3.751793	4	0.4406
All	42.26041	12	0
Dependent variable: DDX5			
Excluded	Chi-sq	Df	Prob.
DDX1	8.865778	4	0.0645
DDX4	8.656245	4	0.0703
DDX6	1.205154	4	0.8772
All	28.45182	12	0.0047
Dependent variable: DDX6			
Excluded	Chi-sq	Df	Prob.
DDX1	6.004358	4	0.0988
DDX4	1.468352	4	0.8322
DDX5	1.493952	4	0.8277
All	7.957921	12	0.7884

TABLE 12: Summary description of Granger causality test.

Explained variable	Explanatory variables	Granger causality test
	UPDI	Accept
GOP	TIE	Reject
	BP	Reject
UPDI	GOP	Accept
TIE	GOP	Accept
BP	GOP	Accept

cause of the development of the marine culture industry, but the development level of the marine culture industry is not the Granger cause of the development of the marine economy.

3.7. Stability Test. Only when the VAR model is stationary, the impulse response convergent, and the analysis is of economic significance. Therefore, the stationarity test of the established VAR model should be carried out. The value of the characteristic polynomial determines the stability of the VAR model. As the lag length of the model is 2 and there are 4 endogenous variables, the unit root of this model has 2×4 unit-roots. In this paper, the established VAR model is stable with a test.

4. Conclusions and Suggestions

Building a new development pattern based on the "double-cycle" is a major strategic plan of China. Fujian province has rich and profound marine cultural resources and deposits. How to enhance the driving force of marine culture in marine economic growth is not only the inevitable requirement for Fujian province to respond to and integrate into the national strategic deployment and build a new development pattern, but also the only way to meet people's demands for high-quality culture and a better life. Under the background of the new development pattern of the "double cycle," Fujian Province is taken as the research object to construct an indicator system of marine culture development to reflect the living standard, employment level and spiritual and cultural level of people in the marine area, and the external influence of marine economy and marine culture industry is taken as the indicator variable to measure the integrated development. The internal changes are regarded as the index to evaluate the integration level of the two, and the evaluation theoretical model of the dynamic evolution level of marine economy and marine cultural industry is constructed. The vector autoregression model and impulse response function are used to study the interactive correlation between the growth of marine economy and the development of cultural industry. The results show that: In the long run, there is a co-integration relationship between the marine culture industry and the gross ocean product (GOP), which is a long-term balanced and stable relationship. The development level of marine economy and the development of marine culture industry are mutually influencing and promoting.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest regarding this work.

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Research Article

The Influence of Enterprise Culture Innovation on Organizational Knowledge Creation and Innovation under the Ecological Environment

Ying Yuan [1,2] **and Tong Chen**[1]

[1]College of Management and Economics, Tianjin University, Tianjin 300000, China
[2]College of Management and Economics, Qinghai National University, Xining 810000, China

Correspondence should be addressed to Ying Yuan; 2008010@qhmu.edu.cn

With the continuous development of economy and society, ecological environmental governance has been put on the priority agenda. In the process of ecological environmental governance, the state, society, and enterprises bear different responsibilities, respectively. As the main body of social economy, in the development of enterprises, the protection of ecological environment is the due meaning of enterprise culture is always paid attention. Whether enterprises can achieve success is not only directly affected by the development strategy, management mode, business philosophy, management tools, and other aspects but also indirectly affected by its own cultural construction level. Although corporate culture has changed due to the development of the network environment, the challenges of corporate culture innovation in terms of values and cultural conflicts should not be underestimated. It can not only enhance the centripetal force of all the employees but also enhance the competitive advantage of the enterprise. In addition, corporate culture also plays a positive role in enhancing office efficiency and increasing production capacity and output. Starting from the role of corporate culture, this study studies the characteristics of corporate culture under the background of implementing ecological environmental governance, addresses the challenges of corporate culture innovation in the new environment, and puts forward the measures of corporate cultural innovation, which provides reference for corporate culture innovation.

1. Introduction

The ecological crisis of globalization is an indisputable fact, China's situation is not optimistic, which makes our country ecological environmental management on the priority agenda ecological environmental management a complex system engineering, must adhere to the morality, the rule of law, and science and technology, therefore must strengthen bear responsibility, and build a reasonable and complete responsibility. In ecological and environmental governance, the government, enterprises, and other social organizations each perform their respective duties and assume their own responsibilities.

Ecological environmental governance refers to the establishment of a series of ecological environmental cooperative relations by various public or private institutions and managing ecological and environmental issues from different levels through the formulation and basis of certain norms and norms, to improve the ecological environment and promote sustainable human survival and development. As the main participant in the market economy, enterprises play an indispensable role in the ecological environmental governance. The responsibility of ecological and environmental governance and environmental protection should always be tied to enterprise status, reputation, development, and even life and death and can always be subject to social inspection and torture. Cultural factors are the indispensable basis and conditions for analyzing the operation of an enterprise, and corporate culture contains the social capital required for enterprise

innovation. Enterprise innovation in the network environment is more dependent on enterprises to build high-quality modern social capital, and the construction of modern social capital that is compatible with enterprise innovation in the network environment is inseparable from corporate culture innovation [1]. High-quality modern social capital is an effective guarantee for the innovation of Chinese enterprises and an important means to improve the performance of enterprises.

In the process of continuous social and economic development, corporate culture plays an increasingly important role, and the construction of corporate culture is listed as an important part of enterprise development. With the deepening of market competition, enterprise management innovation has become inevitable, and only continuous innovation can improve their management quality and efficiency, thereby improving management advantages and promoting the sustainable development of enterprises. In the construction of corporate culture, publicizing corporate culture and transmitting corporate culture are an important way to reflect corporate values and development concepts. In addition, the construction of corporate culture can stimulate the creativity of employees, improve the efficiency of enterprise management, and ultimately complete the strategic development goals of enterprises. The development of modern enterprises, only through continuous innovation and upgrading, can maintain the same direction with the development of the times and add impetus to the development of enterprises. As the spiritual pillar of enterprise development, the innovation of corporate culture is the concept and viewpoint that enterprises break away from the previous cultural construction that are inconsistent with enterprise management and coordinate and match the development of enterprises with the environment, to form a culture that reflects corporate values. The relationship between corporate culture innovation and enterprise management innovation is very close, and it is necessary to face up to the relationship between the two, explore the important impact of corporate culture innovation on enterprise management innovation, and promote the vigorous development of enterprises.

Under the conditions of market economy in the information network era, with the continuous development of China's economy and society, how to innovate and shape corporate culture will attract much attention. The survival and development of enterprises are increasingly manifested as innovation and development of corporate culture, and the role of corporate culture in the survival and development of enterprises is becoming more and more important, which has become the cornerstone of enterprise market competitiveness and the key to determining the rise and fall of enterprises [2]. In the context of economic globalization and ecological and environmental governance, the innovative research of corporate culture should be based on a comprehensive, dynamic, historical, and global strategic vision, actively create a people-oriented, innovation-based corporate culture, and provide a strong and long-term strategic competitive development platform for the strategic development of enterprise management and scientific

management. At present, corporate culture is the most ambiguous place in enterprise management, and it is also the most challenging link. The innovation and development of corporate culture have given modern enterprise management a new strategic significance.

2. Corporate Culture

2.1. The Concept of Corporate Culture.
Corporate culture is a cultural phenomenon, which is formed in the operation and management process of enterprises. Corporate culture is the glue of employee values, moral codes, and behavior patterns and is a comprehensive reflection of the overall style of employees within the enterprise [3]. Corporate culture is also the embodiment of the core ideas of enterprise owners, with the help of cultural factors to form an impact on the work behavior, ideas, attitudes, and other aspects of internal employees and finally form a holistic cultural atmosphere through continuous accumulation [4]. Once the corporate culture is completed, the role played by its own operation and management cannot be underestimated. Corporate culture is formed on the basis of the core value system of the enterprise, with a continuous common cognitive system and habitual behavior. The structure of corporate culture is divided into four levels: the core layer (values), the deep layer (behavior level), the institutional level, and the image level [5], as shown in Figure 1.

Corporate culture is the organizational culture of the enterprise, which revolves around all aspects of enterprise operation and management. The management of the enterprise is inseparable from the enterprise team spirit, corporate culture has a positive impact on the creation of corporate team spirit, the team responsibility awareness, and the sense of mission to improve the role of promotion and can be understood as all internal employee codes of conduct and values of the unified performance, and the employee behavior has a positive incentive effect and can make active participation in corporate activities, for the enterprise to make more contributions. As shown in the figure, the content of corporate culture mainly includes three dimensions: innovative values, innovative systems, and behavior patterns [6], as shown in Figure 2.

With the continuous development of social economy, people constantly plunder natural resources and the discharge of various toxic and harmful substances. Today, ecological and environmental governance has become a major event concerning the rise and fall of the world. Under the background of the current development of our national ecological civilization, only when enterprises can constantly improve their own mechanism and constantly strengthen the quality of environmental management in the enterprise culture, they can promote the sustainable and stable development of enterprises. In this context, the model of enterprise culture construction also needs to be innovated.

2.2. The Role of Corporate Culture.
The value of corporate culture is mainly reflected in the needs of self-interest, through observing the changes in the ideology and spiritual
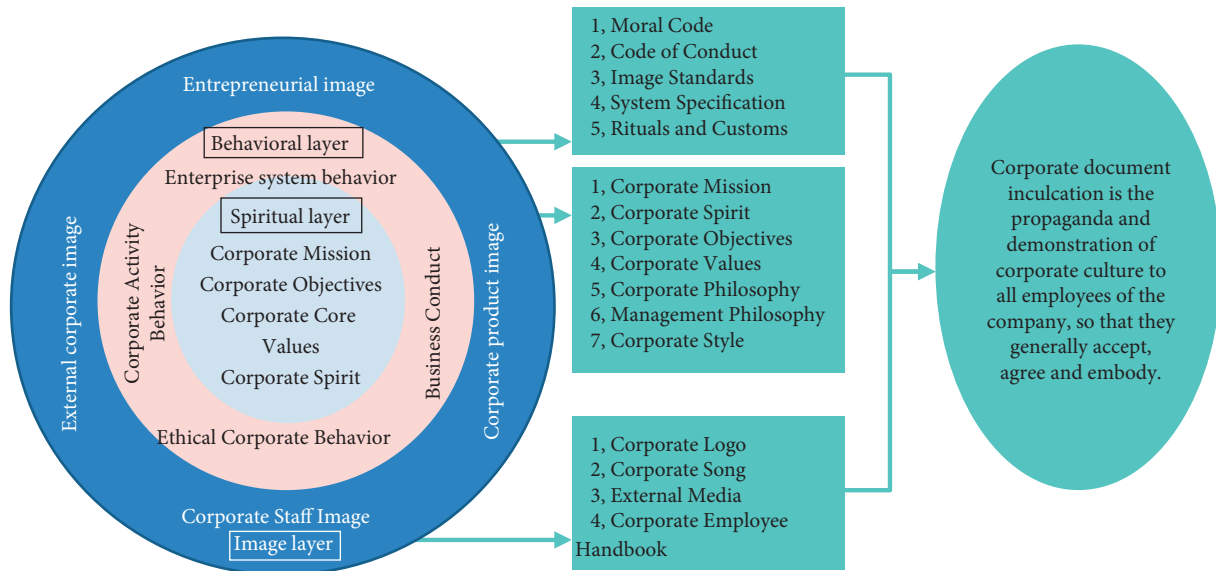
FIGURE 1: Four levels of corporate culture.
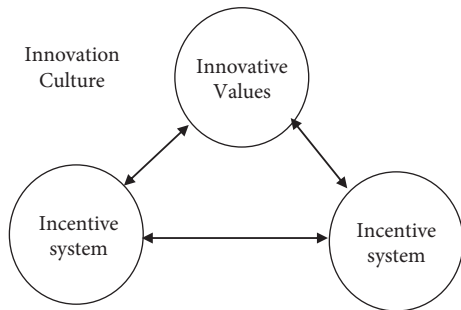
FIGURE 2: Three dimensions of corporate culture content.

FIGURE 3: Central role of corporate culture.

atmosphere of internal employees, with the help of reasonable guidance means to gradually cultivate the value concept that caters to the development and business objectives of the enterprise [7]. As shown in the figure, corporate culture plays a central role in the construction of the company and can unite all aspects of the company's construction, as shown in Figure 3.

2.2.1. Guiding Role. The formation of corporate culture is based on the premise that the values, interests, and management concepts of enterprise employees are consistent with each other. Corporate culture has a guiding function, and it can clarify the development goals and directions for the enterprise, enhance the fit of employee behavior and corporate culture, let employees decide their own words and deeds according to the development goals and development direction of the enterprise, and not only can enhance the self-discipline of their own behavior but also an effective way to motivate employees' enthusiasm [8].

2.2.2. Incentive Effect. This incentive effect is mainly reflected in two levels: one is the spiritual level of employees and the other is the material level of employees [9]. Whether

the corporate culture is excellent is directly related to the degree to which the employees of the enterprise improve their comprehensive ability and quality and also determines the degree of contribution of each employee to the development of the enterprise. In the process of building corporate culture, it must closely focus on the core concept of being people-oriented, paying attention to respect, trust, and care for people, and helping employees to achieve role transposition, from the hired subject to the ownership of the enterprise, so that it is more conducive to tapping the potential value of employees and contributing more youth and enthusiasm to the enterprise.

2.2.3. Binding Effect. This constraint is not mandatory, but achieves the restraining effect of implicit influence through the subtle form. If an employee's words and deeds are contrary to the corporate culture, it will inevitably be rejected by other employees, and this invisible pressure will inevitably change the wrong words and deeds of employees for a long time, enhance self-discipline, and reintegrate into

the collective to work together for the development and progress of the enterprise.

2.2.4. Cohesion.

The formation of corporate culture helps to enhance the connection between the main body of the enterprise and the internal employees, and employees can continuously improve themselves while the enterprise obtains rapid development. Looking at the cultural construction of major outstanding enterprises, "cohesion" is the focus of emphasis. Generally speaking, the development of enterprises needs three ties (cultural ties, power ties, and capital ties) as the bridging point for each factor of production, and the role played by the Chinese ties is the most important [10].

2.2.5. Radiation Effect.

In addition to the above four functions, excellent corporate culture can also play an important role in social opinion. The evaluation of the external image of the enterprise by all sectors of society also determines the competitive strength of the enterprise in a certain aspect. Based on the Internet age, there are many carrier tools that can be relied on to exert the radiation effect of culture, such as communication media and public relations.

2.3. Characteristics of Corporate Culture.

Corporate culture is abstract. In the networked society, the culture of each enterprise is unique and has a binding role. In the process of building corporate culture, managers develop relevant strategies and rely on the transmission mechanism of the information platform to let employees understand the business objectives and business direction of [11]. The specific arrangements of various affairs of the enterprise are also realized by relying on the various functions of the network platform and the corporate culture formed by employees through the integration with corporate values; on the contrary, the values expressed in the corporate culture are also transmitted and shared among employees, thereby enhancing the sense of belonging and honor and disgrace of employees to the enterprise.

In the network society, the focus of enterprise management has also undergone great changes, mainly manifested in the transformation from groups to unit individuals. In this context, traditional rules and regulations are gradually being replaced by online platform information, and the corresponding managers' rights and decisions have also been weakened [12]. Therefore, the management of modern enterprises can no longer follow the previous centralized management model, but needs to be converted to a decentralized management model, through the construction of corporate culture to standardize internal governance and enhance the degree of compatibility between individual employee behavior and the overall development goals, which is also a necessary premise for the long-term survival and development of enterprises.

Because the Internet has the characteristics of fast information dissemination speed and wide dissemination range, it greatly enhances the penetration ability of corporate culture, and the information between the senior management of the enterprise and ordinary employees can be quickly disseminated and interacted in a timely manner. In the network environment, enterprises should regard interactive culture as the key core of cultural construction, and the emergence of network technology has enabled culture to be shared and broken through the hierarchical barriers due to the previous internal structure [13]. Don in the book "Digital Growth" published by Tapsco mentioned that in the network each individual is not only a participant in culture but also a maker of culture, and the original intention of network culture is to carry out a virtuous circle among network users by completing the construction of information transmission bonds. It can be seen that if you want to do a good job in building and maintaining network culture, you need the joint efforts of all participants, and relying solely on information technology will not work [14], as shown in Figure 4.

As shown in the figure, Denison's organizational culture evaluation model, he completed the construction of the organizational culture model on the basis of the corporate culture scale. The model is highly applicable, which can not only reflect the connection between the stability and flexibility of the enterprise but also reflect the internal and external concerns of the enterprise. He also analyzed the effectiveness of corporate culture and corporate organization from four levels (consistency, mission, adaptability, and participation), and on this basis, he divided the evaluation model structure into 12 specific aspects [15]. As can be seen from the above figure, the two cultural characteristics on the left and the right, respectively, reflect the flexibility, change, and stability of the enterprise. The two cultural characteristics of the upper and lower levels reflect the external and internal concerns of the enterprise.

Participation: the evaluation scope of this dimension includes the sense of responsibility, business performance, and ownership psychology of enterprise employees, and according to the questionnaire analysis structure, it can reflect three aspects of enterprise employees: 1. employee ability; 2. close communication; and 3. trust in authorization and ability [16]. There are three indicators involved, namely indicator 1 (authorization), indicator 2 (team positioning), and indicator 3 (capacity improvement). There are many factors that can be reflected in the authorization indicators, such as the intensity of employees' sense of belonging to the company and their positive attitude towards their own work. The elements reflected in team positioning indicators include the degree of importance that enterprises attach to employees' cooperative behavior and the degree of dependence of employees on teams when carrying out specific work. Elements that reflect competency improvement indicators include the importance that companies attach to employee training and the performance of employees' need to learn new knowledge.

Consistency: the evaluation direction of this dimension mainly focuses on two aspects: one is to reflect the performance of the internal culture of the enterprise in the strength of cohesion and the other is to reflect the current situation and value of the core culture construction. This dimension
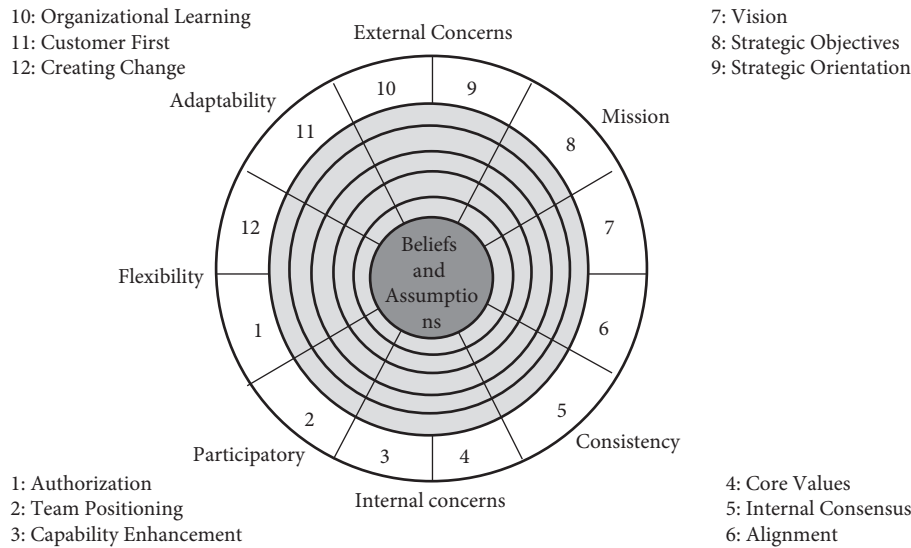
FIGURE 4: Denison organizational culture evaluation model.

examines three aspects of the enterprise: the first is core values, the second is internal consensus, and the last is co-ordination. Elements reflect core values, such as whether all employees of the company have common values or the degree to which the employees of the company recognize these values. On the representative elements of internal consensus, such as whether the leadership of the company's senior management can make subordinate employees converge in various aspects, and on some core interest issues, employees, leaders, and enterprises can reach consensus. The elements reflected in the indicators of harmonization include whether the internal levels and departmental agencies of the enterprise are more complex and whether there is a strong cooperative relationship between various departments.

Mission: this dimension is the ultimate reflection of the long-term interests of enterprises and the emphasis on development planning, and it can be divided into three subdimensions, namely indicator 7 (vision), indicator 8 (strategic goal), and indicator 9 (strategic orientation). As far as the vision indicators are concerned, they mainly reflect two points: one is the degree of expectation of enterprise employees to the main body of the enterprise; the other is the acceptance of expectations by enterprise employees, for example, the sense of consensus shown by the employees of the enterprise on the future scenarios of the enterprise and whether the employees can fully agree with and accept this vision. As far as strategic orientation is concerned, it is mainly a reflection of the strategic willingness of the enterprise, such as the level of competitive goals in the industry in which the enterprise is located and the depth of the perception of the strategic orientation of the enterprise by the employees of the enterprise. Strategic goal indicators are mainly a concrete reflection of strategic orientation, for example, whether the enterprise has formulated in detail in terms of development planning and whether it decomposes the overall goal of the strategic plan and then passes it on to each employee layer by layer as a specific reference for carrying out the work.

Adaptability: the evaluation scope of this dimension mainly focuses on two aspects: the first is the sensitivity of the main body of the enterprise when the external environmental changes; the second is the ability to cope with the external dynamic environment. There are three indicators involved, namely indicator 10 (organizational learning), indicator 11 (customer first), and indicator 12 (innovation and change). Organizational learning indicators mainly reflect the ability of enterprises to respond to changes in the external environment, such as whether the company continues to innovate internal aspects around changes in customer needs and whether it can cater to changes in the market environment to carry out new knowledge acquisition training for employees. The indicators of creating change mainly reflect the attitude of enterprises in the use of innovation factors, such as whether enterprises are willing to accept various risk losses caused by innovative changes and the ability of enterprises to change as the external environmental changes. Customer first indicators mainly refer to the service attitude of enterprises to customers, for example, whether the enterprise can use customer needs as an entry point to analyze customers in combination with the external environment and enhance the customer's sense of experience and satisfaction and whether the enterprise has a certain perceived omen when customer needs change.

2.4. The Concept and Concept of Corporate Culture Innovation

2.4.1. The Concept of Corporate Culture Innovation.
Corporate culture innovation is mainly reflected in two aspects, namely the innovation of concepts and the innovation of the system, and corporate culture innovation occupies an important position in enterprise management and is the foundation of enterprises to maintain strong vitality, but also an important accumulation process of enterprise spiritual wealth. Through corporate culture innovation, enterprises can form a unique style, thereby highlighting the maximum advantages of enterprises.

2.4.2. The Role of Corporate Culture Innovation. Although corporate culture innovation cannot directly bring economic income and material wealth to enterprises, the wealth it brings will be reflected in other forms. From the perspective of the long-term development of the enterprise, the wealth brought by the corporate culture is priceless, and it will exert greater value with the development of the enterprise, and it is also visible that the economic benefits cannot be replaced. Corporate culture is equivalent to national culture; for a nation, national culture has a unique charm, in the long river of history to play a huge role in the development of the river. Corporate culture, as the spiritual pillar and spiritual wealth of enterprise development, must be based on the development of the enterprise itself in the process of innovation and shape a culture that highlights the characteristics of the enterprise. In the process of corporate culture innovation, it is necessary to continuously guide enterprise employees to attach importance to cultural innovation, closely link enterprise innovation with personal development, and continuously improve the centripetal force of enterprises. From the perspective of the internal level of the enterprise, the innovation of corporate culture is conducive to the improvement of corporate image and influence and is conducive to the shaping of corporate brand. Through corporate culture innovation, enterprises can face up to their own development more squarely, lock the course in development, and continue to move in the right direction.

3. The Innovation of Corporate Culture in the Ecological Environment

With the increasing requirements of the society for the ecological environment, enterprises assume more due to social responsibilities. The importance of enterprises to the ecological environment also greatly affects the production operation and production management of enterprises. The production efficiency and operational efficiency of an enterprise depend on the enterprise culture, and to improve the management quality and competitiveness of the enterprise, it is necessary to continuously innovate the enterprise culture in the network environment [17].

3.1. Environmental Management Mechanism in Corporate Culture. Enterprise environmental management mechanism refers to the enterprise according to the current social sustainable and stable development; in the process of enterprise management of an ecological environmental protection concept, from the current management in the process of multiple links to control pollution, through this form of resource resources, it finally achieves enterprise economic benefit and corporate social benefits and environmental protection benefits between efficient unified management form and operation mechanism. As shown in Figure 5, there are three different levels of the current enterprise environmental management mechanism: at the macro-level, an industrial environmental management system is the development body, at the micro-level, and the
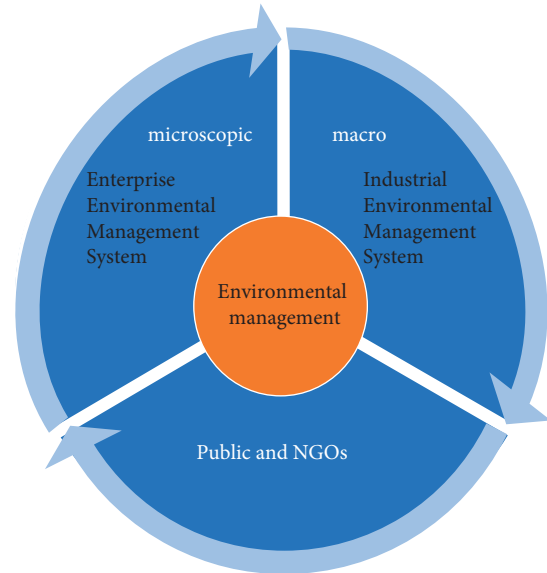
Figure 5: Three levels of ecological environmental management system.

public and NGOs. In addition, some scholars put forward that the current enterprise environmental management form mainly involves four different modes, the current enterprise environmental management committee, and environmental protection professional functional departments of the mutual integration of a management form and ISO14000 management mode. So, we can conclude that the development of the current environmental management system is a diversified structure management system, itself is through the international community and governments, enterprises, nongovernmental organizations, and the public participation, mainly through ecological ethics and environmental system, social development mode and human survival concept and mode, ecological culture education, ecological technology development and application level and enterprise management, and many different factors; the ultimate purpose is to promote the current enterprise resource-saving and environmentally friendly enterprise goals of a management form and specific operation mechanism.

Under the premise of more perfect environmental management mechanism, the ideology, values, and behavior methods of employees have also undergone profound changes, and the enterprise is faced with many new problems and new challenges. The following table shows the measurement scale of corporate innovation culture. It can be measured through the three dimensions of innovation values, incentive system, and behavior mode, to obtain the new challenges faced by corporate culture in the ecological environment. Tables 1 and 2 are the summary data for the valid samples of the questionnaire design survey.

As the endogenous driving force of enterprise innovation, innovation culture can lead all employees of the organization to work together to create an innovation blueprint, and the strong atmosphere of innovation culture helps to promote the innovation performance of enterprises [18]. Figures 6 and 7 show the analysis of the influencing

TABLE 1: Measuring scale of enterprise innovation culture.

Dimensionality	Title item	Variables
Innovative values	Encourage challenges to the status quo and try new ideas, new perspectives, and new methods in this position	XJ1
	Tolerate innovation failures and mistakes and do not punish them	XJ2
	Keeping promises and taking responsibility	XJ3
	Open communication channels and information-sharing channels	XJ4
	Employees have a lot of freedom to do what they are interested in	XJ5
Incentive system	Each department has a model innovator	XZ1
	Every successful innovation is rewarded	XZ2
	Each employee has an innovation target, and employees who fail to complete the innovation target should be appropriately punished and criticized	XZ3
	The company will regularly train all employees on innovative knowledge and skills	XZ4
Behavior patterns	Encourage diversified, multichannel, and multi-departmental learning from each other	XM1
	Encourage employees to share innovative projects, while the originator of the innovative idea can participate in the implementation process of the innovative project	XM2
	Dissent is considered a positive act of innovation	XM3

TABLE 2: Statistical table of sample structure of enterprise innovation culture survey.

		Frequency	Effective percentage
Number of years of business establishment	Less than 2 years	35	15.9
	2–5 years	72	32.7
	5–10 years	73	33.2
	More than 10 years	40	18.2
Number of employees	Less than 10 people	19	8.6
	10–100 people	85	38.6
	100–500 people	81	36.8
	500 and above	35	15.9
Age	Under 25 years	17	7.7
	26–35 years	97	44.1
	36–45 years	74	33.6
	46–55 years	25	11.4
	55 years and above	7	3.2
Number of years of work	Less than 3 years	19	8.6
	3–5 years	77	35.0
	5–10 years	69	31.4
	10–20 years	34	15.5
	20 years and above	21	9.5
Industry	Production	24	10.9
	Electronic information services	29	13.2
	Finance and insurance	55	25.0
	Commercial industry	28	12.7
	Education industry	41	18.6
	New energy industry	24	10.9
	Pharmaceutical industry	12	5.5
	Other	7	3.2
Total		220	100

factors of innovation culture on corporate performance in the study and the analysis of the impact path. The path coefficients of enterprise innovation values, incentive systems, and behavior patterns to innovation performance are 0.51, 0.50, and 0.37, respectively, indicating that there is a significant positive correlation; that is, innovation culture and innovation performance are positively correlated. Cultural innovation ability reflects the innovation competitiveness of enterprises, the strength of innovation ability directly affects the innovation status and honor of

enterprises in the market, high innovation ability is often accompanied by high market acumen, reaction ability, resource integration ability, resource utilization efficiency, financial level, and finally comprehensive performance of enterprise innovation performance. The stronger the excellent innovation culture, the greater the enthusiasm and enthusiasm of all employees to innovate, the stronger the learning and practical ability, and the faster the new ideas are generated and transformed, and these positive effects will eventually cultivate high innovation ability.
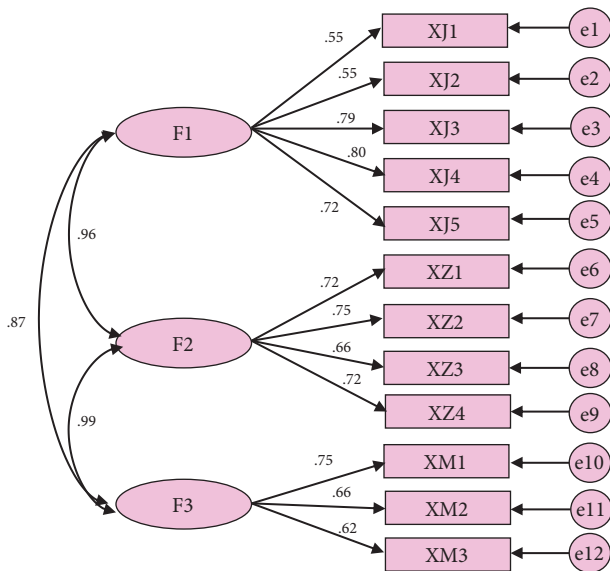
FIGURE 6: Innovative culture validation factor analysis model.

3.2. The New Phenomenon of Enterprise Culture under the Ecological Environment

3.2.1. The Value of the Enterprise as a Whole Is Supreme, and the Values of Suppressing Individuality Are Challenged.

The values of traditional enterprises that emphasize the overall interests and ignore the individual interests are greatly challenged. Figure 8 shows the results of an evaluation of the core values of an enterprise. From the result, it is not difficult to conclude that the corporate culture has formed a "decentralized," people-centered, and individual-centered pattern, and the pursuit of equal interaction and mutual benefit culture has become the trend of The Times. Enterprises must change the traditional hierarchy, administrative management bureaucratic management mode, and users' zero distance interaction [19]. Only by changing the way of thinking and business philosophy of enterprises we can adapt to the changes in the environment.

The emergence of the mobile Internet has made changes in the way enterprises operate and manage, free WeChat has robbed China Mobile, Unicom, and Telecom of their jobs, DiDi Taxi has disrupted the taxi industry, and Yu'e Bao has absorbed 57.1 billion yuan in deposits in 18 days, robbing state-owned commercial banks. The rapid development of mobile Internet has promoted the cross-border operation of the industry and the integration of resources, and the competitive environment has become more complex, and new technologies such as mobile Internet, big data, O2O, Industry 4.0, new energy, new materials, environmental protection, and energy conservation are changing the original economy and commerce. The pattern has an important impact on the way of thinking, behavior, life, and work of enterprise employees, especially young employees. The values of traditional enterprises that emphasize the interests of the whole and ignore the interests of individuals have been greatly challenged, and the following figure shows the results of an evaluation of the core values of a company.

From the results, it is not difficult to conclude that corporate culture has formed a pattern of decentralization, people-centered and individual-centered, and the pursuit of equal interaction, mutual benefit, and win-win culture has become the trend of the times. Enterprises must change the traditional hierarchical, administratively bureaucratic management model and interact with users at zero distance [19]. Only by changing the way of thinking and business philosophy of enterprises we can adapt to changes in the environment, as shown in Figure 8.

3.2.2. The Relationship between the Government and Enterprises under the Background of Ecological Environmental Governance.

Traditional ecological environmental governance takes the government as the main body, and enterprises are forced to implement relevant environmental protection policies. In the current social background, enterprises and governments and government show a trend of cooperative governance. The important difference between cooperative governance and traditional public administration is that it breaks the unity of the political objectives of public policy and separates policy from the linear relationship of the single line solely by the political institution. Under the condition of cooperative governance, the external function of administrative power will be greatly weakened, and the governance subject will no longer rely on the power to directly act on the governance object. The state of administrative power serving the abstract public interest will also change, which will be closely related to the moral consciousness of the holders of administrative power, which is the basic feature of cooperative governance [20].

In the process of ecological and environmental governance, the introduction of public-private partnership not only realizes the complementary advantages between the public and private sectors but also realizes the effective risk sharing. In this way, in the process of ecological and environmental governance, the advantages of the public and private sectors can be fully brought into play to play the effect of promoting strengths and circumventing weaknesses and achieving win-win cooperation. In terms of advantages in the process of environmental governance, the public sector makes use of its own advantages to formulate corresponding specific policies and establish strong policy support and administrative system, so that public projects can get strong support. However, in terms of ecological and environmental governance, the public sector is constrained by budgetary constraints and the lack of sufficient funds, which are often the constraints that cannot be ignored. In addition, the government lags behind enterprises in project management, and the government management efficiency is relatively low, which is a genetic defect in the public sector, and it is often difficult to overcome by itself.

The private sector, however, is relatively funded high management and competitive innovation mechanisms, but the disadvantage of the private sector is that it often faces greater risks and instability. If public-private partnerships are adopted in the environmental governance process, the public and private sectors can complement and complement each
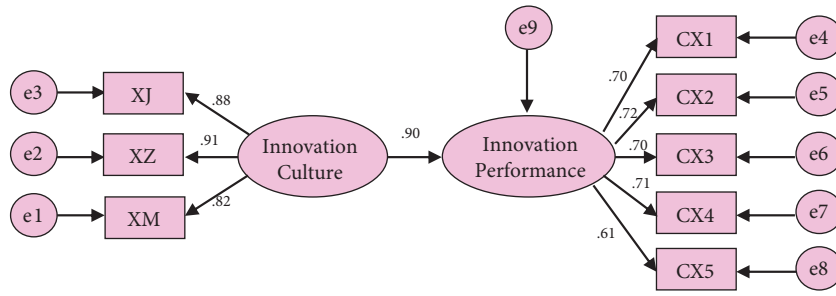
FIGURE 7: Path of influence of enterprise innovation culture on innovation performance.
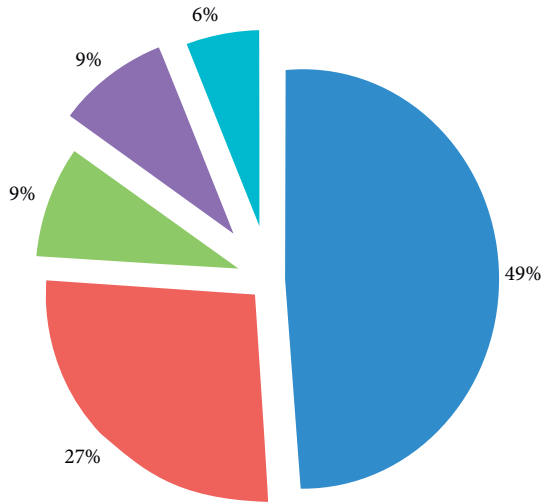
FIGURE 8: Evaluation results of a company's core values.

other. Public-private partnerships can not only contribute to ecological and environmental governance, but more importantly the competition mechanism in public-private partnerships can enable both parties to pay more attention to the quality of the public services provided. Competition makes the private sector in public-private cooperation more active in providing public services and improving the quality of services, which is conducive to achieving efficient ecological and environmental governance.

The relationship between the innovation and development of corporate culture and modern network, economy, society, humanities, and other aspects is correctly handled. Corporate culture is a management ideology and concept formed and developed on the basis of modern civilization, contemporary network informatization, and market economy globalization and is an integral part and embodiment of the core values of socialism. It is changing people's production and lifestyle, changing people's values and outlook on life, and injecting new vitality into the development of society and culture. Today's network information society is an era of great integration of modern cultures such as network, information, and knowledge, and the cultural literacy of enterprise managers directly affects the innovation and development of corporate culture. The innovation and development of corporate culture are a good embodiment of the survival and market competitiveness of enterprises.

4. The Network Environmental Corporate Culture Innovation Strategy

Under the conditions of market economy in the information network era, with the continuous development of China's economy and society, how to innovate and shape corporate culture will attract much attention. As an informal system of the enterprise, corporate culture can essentially shape the personality of the enterprise and the behavior of employees. The role of corporate culture in the survival and development of enterprises is becoming more and more important and has become the cornerstone of enterprise market competitiveness and the key to determining the rise and fall of [21]. Under the condition of economic globalization and information network, the innovation of enterprise culture research, to a comprehensive, dynamic, historical, and global strategic vision, actively builds people-oriented, innovative enterprise culture, the harmonious development of man and nature into the enterprise culture, for enterprise management strategy development and scientific management to provide strong and long-term strategic development platform, as shown in Figure 9.

The construction of traditional corporate culture mainly starts from the three aspects of spiritual culture (MIS), institutional culture (BIS), and visual culture (VIS) to shape the image of characteristic culture and promote the growth of enterprises [22], but under the requirement of sustainable development, enterprise culture needs to adapt to management and development, establish humanistic echo new culture innovation system, enterprise culture into two-way interactive communication, enterprise only change the thinking of enterprise culture construction, give full play to the role of new media, the media, enterprise internal, and external publicity, carry forward the enterprise culture tradition, strengthen the propaganda of environmental protection, and can really do well the enterprise culture construction and environmental protection mechanism construction.

4.1. Adhere to the People-Oriented Corporate Culture Concept. The purpose of corporate culture innovation is to improve the internal cohesion and external competitiveness of the enterprise, to promote the overall progress of the enterprise. The purpose of corporate culture innovation is to improve the internal cohesion and external competitiveness of the enterprise, to promote the overall progress of the enterprise.
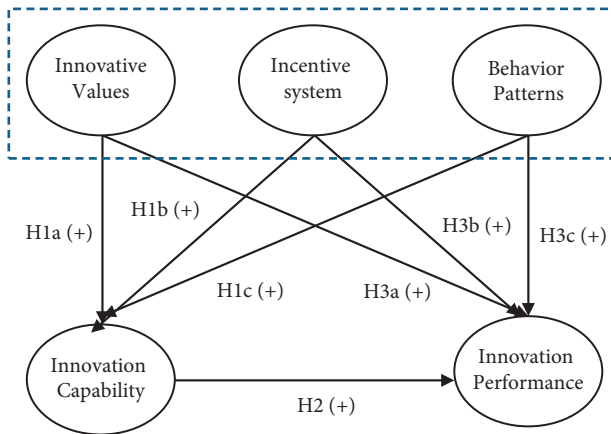
Figure 9: Theoretical model of corporate culture innovation.

The fundamental factor of enterprise development is people, and people are also the most active factor in the productivity of an enterprise. The harmonious coexistence of people and environment is the inevitable of social development, and enterprise culture construction from the enterprise development strategy, according to the characteristics of flat and network organization, adheres to the people-oriented, through the joint efforts of all staff, creates positive cultural atmosphere, forms and meets the needs of the mainstream organization of enterprise values, and builds the spiritual culture of the enterprise. The culture of Alibaba subsidiaries has its own characteristics: Alibaba Company pursues steadiness and efficiency; Taobao culture is younger and more lively, close to grassroots, and Alipay and Yahoo are close to elite culture. As Zeng Ming, president of Yahoo China, said, "The best culture should match the corporate customers and the living environment they live." Peter to network organization to a symphony orchestra, in the "symphony orchestra," only one highest conductor, composed of organization members is a large number of experts, and they work in accordance with the unified "movement," "conductor-musician," and "musician-musician," and the "instruction" between "communication" is the electronic pulse and network. Nowadays, because of its convenience, immediacy, and accuracy characteristics, the mobile Internet has penetrated into people's work, life, and entertainment and also promotes the reform of enterprise management. The creativity and enthusiasm of employees have become the core driving force for the survival and development of the enterprise. Therefore, managers need to give up the centralized control of the organization and adopt decentralized management to ensure the flexibility of the organization. At the same time, the corporate culture needs to maintain the effective operation of the organization, and people-oriented has become an inevitable requirement of the enterprise. Mr. Smith, the founder of FedEx, the world's largest express delivery company, said employees are an integral part of the decision-making system. "Putting people first, they provide a high level of service and profits follow." Enterprise managers should pay attention to the changes in employees' demands, pay attention to the personal growth and physical and mental health of employees, especially the new generation,

increase communication channels, build a platform for employees to show their talents, and enhance their sense of belonging.

Therefore, in the process of corporate culture innovation, we must always focus on the common values of the "two supremes" industry and combine the actual formation of our own unique cultural concepts, and in the process of practice of the implementation of business policies, strategies, etc., we must summarize the practical experience in a timely manner, upgrade it to a value concept recognized by all employees, and resolve the shortcomings of corporate culture package customization.

4.2. Formulate a Corporate Culture Landing System and Strengthen Execution. The management system of the enterprise can help the enterprise to pursue the greatest economic interests. The enterprise management system is a mandatory obligation formulated by an enterprise in the production and operation management activities, and the provisions or regulations that can guarantee certain rights cover all the rules and regulations of the enterprise, such as the personnel system, the production management system, and the democratic management system. One of the important components of corporate culture is the institutional culture of the enterprise, which is also the carrier and foundation of the spiritual culture of an enterprise. Excellent corporate culture is reflected in the scientific, perfect, and user management system and management methods. The construction of enterprise culture must ultimately be implemented in the system, and a standardized management system can be formed to make the behavior of enterprise employees have rules to follow, laws to follow, and avoid or reduce blindness in construction. The system is a strong guarantee for the landing of corporate culture, and a reasonable system culture has a good guiding, motivating, and restraining effect on the behavior of employees. It should be noted that when formulating a system or a system conflict or absence, the spirit of the corporate culture concept must be taken as the criterion to ensure the smooth implementation of the corporate culture. When a company's strategic objectives change significantly, the rules and regulations of the enterprise must change from time to time. At the same time, different employees under the network economy should be treated differently, such as repetitive work to adopt quota assessment and innovative work to adopt flexible system incentives; in-house is suitable for a clear division of labor, and fieldwork should be flexible and appropriately authorized. Alibaba's quarterly supervisors conduct behavioral assessments of each employee in two parts: performance and values account for 50% each. Each concept in the corporate culture value system must be supported and implemented by the corresponding management system, and the implementation of the system, the supervision of the subordinate to the superior, and the suggestions of employees are all included in the system design. This is conducive to breaking the backward management system, enabling employees to participate in management, and stimulating employees' enthusiasm and professionalism. According to the
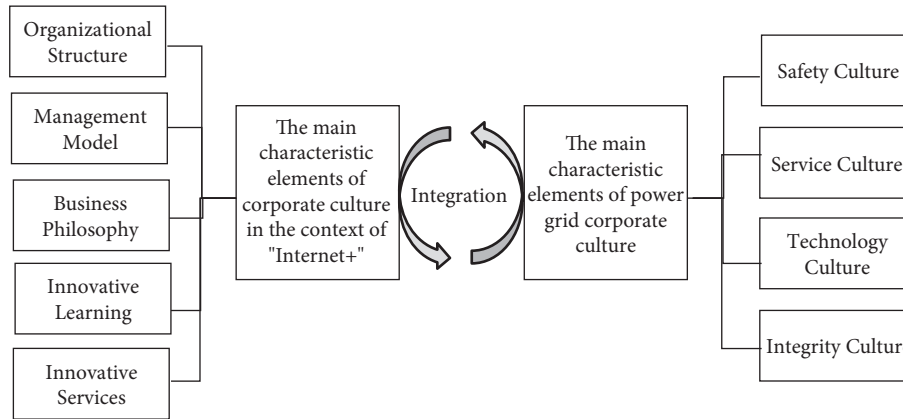
FIGURE 10: Integration path of corporate culture.

characteristics of networking and platformization in the Internet era, Haier has explored and established a "win-win-win model for people in one," turning employees into entrepreneurs and becoming their OWN CEOs through employee customization The flat organization implements platform management and builds enterprise employees, suppliers, and users into a community of interests, thus forming a new enterprise ecosystem, truly making enterprises responsible for users, realizing seamless docking between enterprises and users, and turning the external coercion of corporate culture into an internal drive.

4.3. Innovation Builds the Enterprise Culture Material Layer.

The material layer of corporate culture is the external layer of the core layer of corporate philosophy, the most basic content of corporate culture, as the visual part of the direct perception of the public inside and outside the enterprise, and also the basic basis for the public to evaluate corporate culture.

In the network environment, it is necessary to incorporate elements related to the corporate culture of "Internet +" and the grid into the corporate culture, as shown in Figure 10.

The material layer of corporate culture mainly includes four major systems of visual recognition, material environment, product matching, and cultural dissemination, and enterprises can put forward the planning and principles of material culture construction, hire professionals to complete specific business, and corporate culture management personnel participate in and supervise and check, mainly from four aspects:

First, comprehensive planning is implemented step by step. The construction of the material layer of corporate culture needs to be carried out in accordance with the principles of overall planning, inheritance, and innovation, and step by step, with high standards and strict requirements, and implemented step by step at different levels and in different professions, to display the corporate brand image and highlight the personality of corporate culture.

Second, the cultural environmental experience is enhanced. It is necessary to design an attractive cultural environment, attract employees to participate in, and strengthen the cultural experience through celebrations and cultural and sports activities, to achieve edutainment, create a lively corporate culture atmosphere of full co-construction, and infect, educate, and motivate employees with a good cultural environment.

Third, the carrier of corporate culture is improved. The material layer of traditional corporate culture construction continues to expand to all aspects of the enterprise supply chain and value chain, actively attracts corporate shareholders, customers, suppliers, and the public to participate in the construction of corporate culture, and improves the corporate culture system through two-way dissemination of culture, to shape a good corporate image.

Forth, in addition to the traditional carrier brand trademark, building environment, visual identity, and product packaging, we should also pay full attention to the construction of network carriers such as intranet, extranet, international Internet, WeChat, and Weibo. Various new media are fully used, and a variety of platforms to spread corporate culture are built, such as organizing brand promotion, customer friendship, employee recognition, and colorful cultural activities, enriching the spiritual and cultural life of employees, breaking the cold network relationship, promoting employees and enterprises to breathe together and share a common destiny, and stimulating employee team spirit. New media tools such as email, BBS, MSN, and QQ are fully used and be easily accepted by employees. The BBS of the enterprise can become the position of publicizing the corporate culture, and the employees can anonymously express their dissatisfaction with the enterprise, make suggestions and opinions, release the relevant information of the enterprise through the BBS, and carry forward the main theme of the corporate culture by correctly guiding and disseminating the corporate culture. For example, Huawei in Shenzhen uploads stories promoting the core values of the company to the BBS community, makes videos for employees to watch, and timely releases dynamic information about the enterprise, and the access rate is very high. As the main mobile device in the era of mobile Internet, enterprises need to use mobile phones to strengthen the implementation of corporate culture.

Establish a mobile newspaper for corporate culture work, integrate corporate news, business knowledge, and other information, and publish it regularly through mobile phones, so that employees can participate in corporate culture work in a timely manner. By using the WeChat function of mobile phone, establish a WeChat communication platform for corporate culture, carry out various discussions, and realize the landing of corporate culture.

5. Conclusion

Under the condition of increasing social requirements for sustainable development, due to the social-ecological subject status of enterprises, the protection of ecological environment has brought new requirements to the management and management concept of enterprises. At the same time to the construction of enterprise culture and environmental protection mechanism brought new challenges, employees organization hierarchy concept, democratic consciousness, the pursuit of equality, and mutual benefit culture become irreversible trend, enterprise culture from one-way spread into two-way interactive communication and enterprise ecological environmental protection and management from passive to active. Therefore, in the context of ecological environmental governance, we must pay attention to the participation of corporate culture, give full play to the role of new media and we-media, adhere to the people-oriented corporate culture concept, actively publicize environmental protection policies and environmental awareness, pay close attention to green and sustainable development in the operation of enterprises, integrate ecological and environmental protection into the corporate culture gene, formulate the enterprise culture implementation system and strengthen the executive force, make full use of the various new media outlets, to build various platforms to spread corporate culture, carry forward the corporate culture and tradition, make employees timely participate in the corporate culture work, through "into the brain," "into the ear," and "into the heart" to achieve corporate culture landing, to achieve full participation of government, businesses, and individuals, and finally realize the improvement of the ecological environment is realized.

In summary, corporate culture innovation to a large extent affects the enterprise management innovation, and corporate culture innovation can continuously improve the centripetal force and cohesion of the enterprise, reflect the core values of the enterprise, play a positive guiding role in enterprise management innovation, point out the direction for it, improve the innovation and creativity within the enterprise, constantly promote the innovation and improvement of various management systems of the enterprise, and fundamentally improve the enthusiasm of the employees of the enterprise. Employees who engage in their work with a more proactive attitude will achieve more results with less effort. The formation of corporate culture is a slow process, and this process requires continuous reflection, breakthrough, abandonment, and sublimation, so that enterprises maintain inexhaustible power, to meet the challenges of the market with a better attitude. Therefore,

through corporate culture innovation, enterprise management innovation can be realized, the operating efficiency of enterprises can be improved, and the maximum value of enterprises can be realized, to complete the long-term strategic development goals of enterprises.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Retraction

Retracted: Design of Personalized Ideological and Political Education Resource Recommendation System in the Online Education Platform in the Network Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] T. Yang and Z. Duan, "Design of Personalized Ideological and Political Education Resource Recommendation System in the Online Education Platform in the Network Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 3845749, 12 pages, 2022.

Hindawi

Research Article

Design of Personalized Ideological and Political Education Resource Recommendation System in the Online Education Platform in the Network Environment

Tao Yang [1] **and Zhiqun Duan** [2]

[1]*Department of Automotive Engineering, Hebei Vocational University of Industry and Technology, Shijiazhuang 050091, Hebei, China*
[2]*Department of Intelligent Manufacturing, Hebei Vocational University of Industry and Technology, Shijiazhuang 050091, Hebei, China*

Correspondence should be addressed to Tao Yang; yangtao_1008@163.com

In the network environment, online ideological and political education is facing many challenges, the mainstream values of education have been impacted, and the backward educational model, single communication method, and solidified educational content are not conducive to the smooth progress of ideological and political education. However, at the same time, its innovation also ushers in development opportunities, rich educational resources, information platforms, diversified education subjects, strongly targeted education models, etc., which can become favorable factors for educational innovation. To this end, online educators should seize the development opportunities, grasp the good network environment, actively build a network platform for ideological and political education, create a personalized ideological and political education resource recommendation system, and reform the ideological and political education classroom, effectively playing the role of the main position of educating people. Online education breaks through the limitations of time and space, allowing students to get guidance from online teachers without leaving home, and is favored by more and more primary and secondary school students because of its unique advantages. At present, the forms of tutoring for off-campus online education in China are diverse, and there are several specific teaching modes. Whether online teaching can meet the needs of users is a problem worth studying.

1. Introduction

In recent years, with the development of Internet technology, online education has also come into being, and online education has been favored by more and more users because of its convenience, intelligence, and many other advantages. Relying on intelligent detection tools to assist teaching, online education can provide "personalized" tutoring to solve the learning problems of different user groups; with the popularity of 5G, the problem of network latency will be solved, and teachers and students will communicate more smoothly through the Internet. In recent years, a series of favorable policies and social events have promoted the steady and rapid development of online education.

In February 2021, the China Internet Network Information Center (CNNIC) released the 47th Statistical Report on the Development of China's Internet Network in Beijing, showing that "as of December 2020, the scale of China's Internet users reached 989 million, an increase of 85.4 million over March 2020, and the Internet penetration rate reached 70.4%, an increase of 2.5 percentage points over March 2020." According to the Internet Penetration, more than 50% of the net-citizens are under the age of 40, and among them, the largest number of the net-citizens is students, accounting for 21% as shown in Figure 1. With the increase in the scale of net-citizens and the penetration rate of the Internet, online education has gradually developed. In the context of the Internet era, combined with the needs of

Internet users and Internet penetration
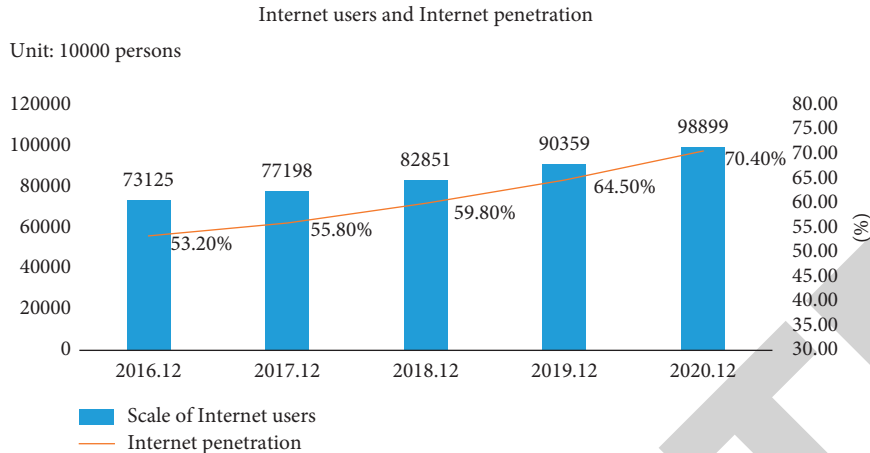
Figure 1: Scale of net citizens and Internet penetration rate.

the new era for online education, in order to improve the timeliness and effectiveness of online Ideological and political education, it is necessary for online education platforms to explore new ways to innovate the ways and means of online ideological and political education [1].

Ideological and political education is a key link in the fundamental task of online education platforms to improve individual ideological quality, and it is also an important part of online quality education (Figure.1). With the development of 5G technology, based on the mobile education environment, online ideological and political education has become an important educational path for political education on online ideological platforms in the new era [2]. The new media digital technology represented by the mobile Internet has also brought new challenges to the collaborative management of online ideological and political education platforms while promoting the reform of ideological and political education. Obviously, the construction of a collaborative management mechanism for online ideological and political education platforms in the mobile education environment and the creation of a personalized ideological and political education resource recommendation system have important practical application value for improving the effectiveness of ideological and political education [3].

From February to May 2020, the epidemic caused primary and secondary schools to use the Internet for online teaching. According to the Internet Statistics report, during the epidemic period, many online education application platforms had active users. The number can reach the level of tens of millions. (2) In contrast, in the case of off-campus online education, a number of high-quality teaching platforms have emerged in recent years, many large amounts of financing have been obtained, and the total annual financing has exceeded 10 billion yuan. (3) Online teaching organized by the school during the epidemic period. Classes can only achieve basic functions such as page sharing and audio and video communication, and the off-campus online teaching platform can achieve more diverse functions. On the "bright future" online platform, primary and secondary school principals provide online educational consultation, and their user groups involve more than 200 cities across the country.

In addition, the platform also actively develops artificial intelligence technologies such as speech recognition and expression recognition to assist classroom teaching. During the course, real-time interaction, Q&A, classroom detection, voice testing, and other functions can be realized. (1) In addition to the online teaching learning platform, there are also some tools to assist the learning app. For example, Jopshelp is a photo search tool, which can take pictures of the question upload, relying on the text and image recognition function, and present the steps and analysis of the question taken. In addition to taking pictures and searching questions, Homework Help is also autonomous. It has developed functions such as composition search and ancient Chinese search. Because of its convenient function, it is welcomed by many teachers and students, with a total of 800 million users and a monthly average of 170 million users. In addition, there are a series of online teaching in primary and secondary schools such as children's programming and English foreign teachers.

During the new crown pneumonia epidemic, the development of online education has been accelerated, teachers in many schools have adopted the Internet to conduct live teaching, the off-campus online education platform has a variety of teaching forms, and the functional development is relatively mature compared with the in-school teaching. Primary and secondary school students have basically carried out the process of online learning, a certain understanding of online teaching. Besides, the investigation on students' demands for off-campus online education shows that they also expect to provide relevant suggestions for the development of online education.

2. The Necessity of Innovating Ideological and Political Education under the Internet Environment

2.1. The Need to Grasp the Right to Speak in Ideological Work. Ideology determines the direction of the direction and development of a country's culture, has a bearing on the will of the people, the development of the economy, the stability of

society, and the security of the country, and is an extremely important task of our party and our country. With the improvement of mobile network technology, the struggle in the ideological field has become more and more complex [4]. At present, the ideological construction of online education platforms is also facing severe challenges, and the ideological work of online education platforms should take the initiative to open up new positions, learn to use new means, adopt a popular way, firmly grasp the right to speak, and enhance initiative. At the same time, we must also learn to use mobile new media to understand public opinion and grasp the dynamics of their thoughts and behaviors. Under the new mobile media, online education platforms should strengthen the guidance of ideological work, improve timeliness, and enhance the guidance of mainstream awareness to the audience. At present, the Internet is full of some irrational voices and disharmonious discourses, such as the spread of extremely wrong statements such as "Marxism is outdated." There are also some people who use the guise of so-called "academic research" to distort and slander history in an attempt to impact the mainstream ideology of our country, which must arouse the high vigilance of online education platforms [4].

2.2. Practicing the Guidance of Socialist Ideology with Chinese Characteristics. As an online education platform, it must deeply understand the essential characteristics and cultural connotations of socialism and should fully integrate Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era into ideological and political education, especially pay attention to making good use of and giving full play to the Internet, give full play to the advantages of the mobile Internet, and use flexible, diverse, and colorful forms. Do a good job in publicizing and interpreting the socialist ideology with Chinese characteristics, so that, in the world of the audience, it can "see every day," "every day is new," and "every day is deep," strengthen the guidance of the core values of the public, and ensure that the relevant reports of General Secretary Xi Jinping can firmly occupy the headlines of the online education platform. Truly let them sink into their minds and deepen their identification with the theoretical character, practical value, and ideological charm of new ideas [5].

2.3. The Internet Has the Characteristics of Respecting and Meeting the Individual Needs of Online Education Audiences. According to the previous survey, compared with the traditional Internet, the mobile Internet has the advantages of learning and information communication anytime and anywhere and can fully use the audience's "fragmented time" to improve learning efficiency, which provides convenience for the public to pursue values such as autonomy and individuality [6]. First, the mobile Internet provides the audience with the function of independent choice. The audience's sense of autonomous choice is strengthening, their thinking is becoming more personalized, they like to act in their own way, using the Internet to express themselves, and the mobile Internet provides them with richer, more humane content and flexible operating methods, which can help them achieve this autonomous need [7]. Second, the mobile Internet provides personalized choice needs for the audience. Audiences have a strong desire for differentiation and personality, and it caters to their choices in a flexible way. Third, the mobile Internet provides practical functions for students' learning and life. The mobile Internet can provide a variety of practical information and services for the audience and can meet the needs of different levels of knowledge. Fourth, the mobile Internet provides the possibility for ideological and political education to promote online education. The development of Internet technology has realized the technology of big data extraction, called cloud computing. Under the support of cloud technology, users have realized "ubiquitous learning," that is, users can learn under any location, time, and equipment conditions, and they do not need to maintain equipment and software, learning resources are enriched, learning costs are reduced, and convenience is enhanced [8].

When schools effectively combine ideological and political education with Internet information technology, they can change the status quo of single teaching forms and boring teaching content to a certain extent. By using the Internet information technology, students' interest in independent learning is increased, making students consult materials anytime and anywhere while actively thinking. It is conducive to cultivate students good habits and master good methods in learning. For example, in recent years, schools have actively created red websites for campus ideological and political education, which are diverse in form and rich in content, which increase the interest of students' learning and improve our personal cultivation.

3. The Connotation of Online Ideological and Political Education

3.1. Characteristics of Online Ideological and Political Education on Online Education Platforms. Network ideological and political education is a form of ideological and political education with college students as the main body of education [9], in accordance with the teaching plan and ideological and political education theory of the online education platform, give full play to the role of Internet technology, and realize the online education platform objectives of ideological and political education [10]. The educational means of network ideological and political education have their own characteristics: first, openness—the Internet system has no boundaries of regional space, and network information can be spread to any place in the world in a relatively short period of time, with super influence and penetration. The second is timeliness—the Internet is the world's fastest information highway, and its information update and dissemination speed is unmatched by traditional media. The third is equality—network ideological and political education is more flexible than the traditional way and reflects the characteristics of equality in the relationship between educators and the subjects of education [11]. The fourth is interactivity, and there is an activity process of equal communication and effective interaction between educators

and educational objects, which has obvious interactive characteristics [12].

3.2. The Development Trend of Online Ideological and Political Education on Online Education Platforms. Network ideological and political education is a new form of education in ideological and political education, and its development trend is mainly reflected in the following aspects: the coverage penetration function is stronger, and the coverage penetration function refers to the ideological and political education information provided by the educated through the network of accessing the carrier of ideological and conceptual transmission, so that it is affected and influenced [13]. Traditional means of ideological and political education are often subject to factors such as venue and time, the coverage of education is relatively limited, the development of the network can make ideological and political education break through the limitations of time and space, through one-to-many and many-to-many network ideological and political work platforms, to help promote the whole staff, the whole process, and all-round education [14]. Second, it is more innovative. As an innovative carrier of ideological and political education, the Internet is an inevitable requirement for today's social development and the development of ideological and political education. Network political education can adapt to the diversified and convenient needs of young students' access to information channels, guide users to join the interactive activity process, allow teachers and students to exchange opinions on an equal footing, change the mode of communication between teachers and students, and make the breadth and depth of communication reach a new level [15]. In addition, online ideological and political education is more oriented, making the Internet a new front for ideological and political education, passing on the core socialist values to students, strengthening their ideals and beliefs, and guiding young students to continuously improve their ideological level, political awareness, moral character and cultural literacy. Great virtue, public morality, and strict private morality can make users to become qualified socialist builders and successors, leading to all-round development of morality, physical fitness, beauty, and labor [16] as shown in Figure 2.

The rapid development of the modern Internet information technology, with its large amount of information and wide coverage, has not only become the main means and way for students to seek knowledge but also further expanded the cultural and entertainment life of college students. For example, with the help of the Internet, worldwide exchanges and interactions can be learned about real-time information at home and abroad without leaving home; find friends with the same interest on the Internet, encourage each other, and move forward side by side. Increase common topics with others, expand the scope of interpersonal communication, and increase social participation. All these help college students to open their minds, so that they have the ability to respond flexibly to problems, learn from each other, and gradually adapt to society.

4. The Challenges Faced by Online Education Platform Ideological and Political Education in the Network Environment

4.1. The Impact of Heterogeneous Nonmainstream Values. The Internet has produced a huge penetration and impact on social life, and the proportion of student users in the total number of net-citizens is not low [17]. First, cybersecurity issues are frequent. In terms of network security issues, online fraud and personal information leakage are emerging in an endless stream, and there are more student victims in telecommunications fraud cases. Second, cyberspace is open and inclusive. In cyberspace, pluralistic values can be easily disseminated, and all kinds of heterogeneous nonmainstream values are more likely to have an impact on college students [18]. However, college students have not yet formed correct ideological values and lack the ability to correctly distinguish multiple values in cyberspace, which is prone to misconceptions [19].

The information content on the Internet is complex, and the speed of dissemination is very fast. Some websites operate in violation of the law, and even there are illegal acts that make the viewer passively accept pornographic information, so students are easily addicted to it while the convenience brought by network habits, and some students are difficult to resist its attractiveness, resulting in declining academic performance or even more serious consequences. Not only this, Internet addiction will also reduce students' normal life time such as thinking, sleeping, and communicating, affecting students' vision, hearing, memory, and reaction ability, causing both physical and psychological damage. It is easy to lose the real self because of the long-term indulgence in online space, it is easy to confuse the virtual online character with the real character, and in the long run, it becomes a "communication idiot." However, if the negative behaviors and psychology exposed in the network are transmitted to users, it is not conducive to a healthy campus atmosphere, and even affect academic and physical and mental health.

4.2. Traditional Ideological and Political Teaching Classrooms Lose Their Attractiveness to Students. With the popularization of smart phones and the Internet, teachers and students are gradually equal in accessing information, teachers no longer have the priority of obtaining knowledge, and students can freely swim in the ocean of online information and directly obtain information and communicate. Therefore, the Internet age has changed the relationship between teachers and students to "give" and "receive," making a single traditional ideological and political teaching classroom unattractive to students, teachers need to improve their network skills, be good at using diverse network information resources, and create a rich and colorful teaching classroom [20].

The continuous expansion of the massive information in the Internet era makes it more difficult for the huge user groups to screen the massive information resources. With the continuous accumulation of massive information every day, users find the desired information in it is simply to find a needle in a haystack and, at the same time, accompanied by

Hourly Size of China's Online Education Industry,
2012-2022
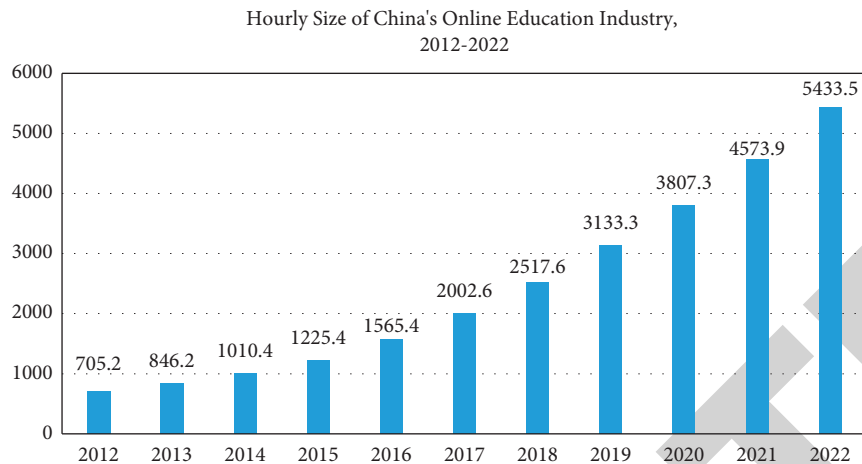
Figure 2: Market size of the online education industry.

the burial of high-quality resources, resulting in a great waste of resources. Personalized recommendation department is an effective technical means to help users quickly identify and screen out useful information for users and help high-quality resources to users who need it. Personalized recommendation system is generally composed of three important modules (Figure 3). First, the user interest model is generated after the analysis of users' personal behavior data record and, second, the establishment of the recommendation project model, and the recommendation engine of end user interest model and recommendation project model.

Target users and similar demand users recommend their video resources of interest. That is, the core point is to take the similarity of users and obtain similar users through the relevant characteristics of users. Then, similar users speculate the interest of their target users and then combine other influencing factors to generate the recommendation list. For its implementation, there are usually three steps (Figure 4):

4.3. A Single Communication Method Cannot Achieve the Goal of Educating People. The online education platform ideological and political education carries an important function of educating people, which is related to the question of "for whom to cultivate people, what people to cultivate and how to cultivate people" [12]. Timely acquisition and grasp of students' ideological dynamics is an essential part of education and teaching, which requires good communication and exchange between teachers and students. In the Internet era, the way of communication and communication is increasingly diversified, the face-to-face teaching method of online education platform ideological and political education still occupies the main position, and students only passively accept theoretical knowledge. In the network environment, college students have developed a variety of learning needs and personalized learning habits, relying only on a single top-down communication method, unable to perceive the true thoughts of students, and teachers cannot know the changes in students' ideas and concepts.

4.4. Solidified Teaching Content Cannot Meet the Needs of Students. The content of traditional ideological and political education is mainly based on the textbooks of ideological and political science, mainly including Marxist philosophy, the theory of socialism with Chinese characteristics, the outline of modern Chinese history, the cultivation of ideological character, and current affairs and politics. At the same time, the overall planning and outline selection of ideological and political education also occupy part of the content. However, in the network environment, college students receive information in more diverse ways, and can feel social hot information faster and more. At this time, teachers and textbooks are no longer the main sources for students to receive relevant theoretical knowledge. If the ideological and political education of the online education platform is still based on fixed textbook content to provide ideological education, it can not meet the knowledge needs of students, nor can it adapt to the habits of students to obtain information, and it will also affect the teaching effect.

4.5. Excessive Use Leads to Students' Gradual Loss of Social Skills. The use of the Internet to communicate has become a common phenomenon around the world, and people use it for work, entertainment, dating, etc. The Internet can break through the limitations of time and space and weaken the traditional way of communication, people can easily make friends of different personalities through the Internet, from getting emotional and self-worth satisfaction. However, when college students are addicted to online communication, they will inevitably ignore the interaction with others in real life, and over time, they will be estranged from their classmates, teachers, and parents, and there will be a strong psychological gap, which will gradually reduce their social communication skills in real life, resulting in lack of self-confidence, avoidance psychology, and gradually interpersonal barriers.
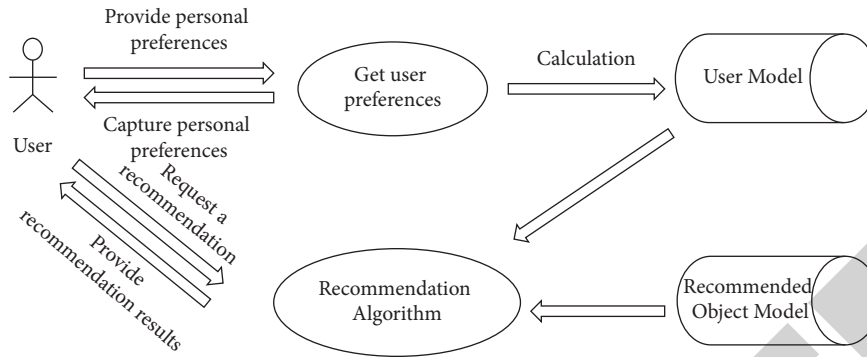
Figure 3: The recommended model.
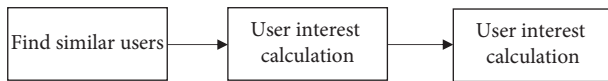
Figure 4: A user-based recommendation system.

5. The Network Environment Brings Opportunities for Ideological and Political Education on Online Education Platforms

With the help of Internet information technology, massive information resources can further enrich educational resources, information teaching platforms can also be effectively built, coupled with the diversification trend of education subjects and the strengthening of education pertinence, and online education platform ideological and political education can achieve a higher level of development and show a stronger educational effect.

First, create a main classroom for ideological and political education. Through the arrangement of collective teaching, individual counseling, individual Q&A and section testing, the traditional ideological and political classroom teaching methods are transformed, and the ideological and political teaching and the Internet are highly integrated, so that the classroom teaching content is more advanced and interesting, and the learning methods are more modern. The audio, film, and television materials that students are interested in are introduced into the study of ideological and political theory class. The class is simple and easy to understand so that students can more easily analyze and solve difficult problems in real life.

Second, use the Internet platform to promote auxiliary functions. Through the combination of multiple online platforms, students are provided with a variety of learning channels. Teachers actively open online tutoring services, enter students' learning circles and social circles through QQ, WeChat, mailbox, Weibo and other forms after class, cultivate and practice modern teacher-student relationships, and always solve problems in life and learning for students. At any time, we should grasp the ideological dynamics of students, minimize the negative impact of the Internet, and enable each student to have a solid grasp of the content of ideological and political education in colleges and universities, taking students as top concern.

5.1. Massive Information Provides Rich Resources for Teaching Ideological Politics. In view of the diversification of information and the efficiency of technology in the network environment, the online education platform Sizheng Education can obtain rich teaching resources from it [14]. On the one hand, the rich and diverse information resources in the online environment can become the material for ideological and political education on the online education platform. In cyberspace, a variety of ideological values and social information are widely disseminated, among which information resources that conform to the core values of socialism are compatible with the knowledge of ideological and political theory can become the materials for ideological and political education on the online education platform. Network technology, on the other hand, updates educational resources in real time. Using the Internet information technology in the network environment, teachers can realize the overall macro control of the development of contemporary college students and current ideological and political education, realize the timely update of teaching resources, and ensure the timeliness of educational content.

The online learning platform guides users to complete the preclass learning evaluation tasks with good credibility and analyzes the users' learning style. Furthermore, the system recommends the corresponding learning resources according to the user's learning style (as shown in Table 1).

5.2. Promoting the Construction of Educational Resource Libraries and Information-Based Teaching Platforms. On the one hand, educators can build a library of educational resources. On the basis of obtaining many educational information resources, online education platform ideological and political educators can build a political education resource library, effectively sort out and analyze teaching resources with big data, cloud computing, and other technologies, and store them in the resource library to provide resource references and educational examples for educators across the country. On the other hand, the network environment can also bring an information-based teaching platform and innovative forms of education to education. The open network information environment can help ideological and political education break through the traditional time and space restrictions, build an information-based teaching platform, put ideological and political

TABLE 1: Explicit classification of learning styles.

Style dimension	Dimension classification	Features	Relevant recommendations
Information processing	Active type	They prefer to verify ideas through experiments, do first and then think, and prefer discussion and teamwork	For example, discussion area and forum
	Contemplative type	They prefer to learn new things through thinking, think first and then do, and prefer to think and work independently	For example, blog and log
Information perception	Perceptual type	More inclined to examples and memories	More specific examples, such as algorithm application
	Intuitive type	More abstract and deductive	More abstract derivation, such as algorithm extension
Information input	Speech type	Prefer explanatory text	PPT, literature
	Visual type	Prefer pictures, videos, etc.	Video and mind map
Information understanding	Comprehensive type	General understanding first and then in-depth	More courses or knowledge navigation marked by "previous and next sections"
	Sequence type	Learn step by step	More general outline

education on the network platform, provide educators and students with online teaching and communication channels, and also promote the innovation of educational forms.

In the process of school learning, students mainly learn through the guidance of the teacher, and sometimes through the form of self-study, because students' enthusiasm for learning, learning basis, learning talent and other factors are different, they will develop different learning ability. And with the continuous improvement of students' learning period, they will learn more and more difficult knowledge, and the corresponding students' learning level will continue to improve. Students have different learning resources, and different students in the same grade also have different learning abilities. Students with strong learning ability are generally able to and are willing to learn resources that are more difficult, while students with weak learning ability can only learn less difficult resources. Therefore, students' learning ability should be considered in the student model. This paper uses the survey questionnaire to determine the value of students' learning ability. In conclusion, we can summarize the student model in Table 2.

5.3. Promoting the Diversified Reform of Educational Subjects. Under the background of the Internet information technology, many entities related to ideological and political education can participate in education, realize the synergistic linkage with educators on the online education platform, open timely interactive exchanges with the help of cyberspace, and help the online education platform ideological and political education to achieve diversified development. In the network environment, all kinds of ideological and political education entities can jointly carry out educational work, provide educators with diversified educational materials and forms of education, and also help educators better understand the learning and life characteristics of contemporary college students and enhance the affinity and pertinence of education.

5.4. Enhancing the Pertinence of Education. With the student user model, the educational resource model and the matching formula, we can establish the whole educational resource personalized recommendation scheme. Figure 5 describes the overall process of the educational resource personalized recommendation scheme in this paper.

Big data technology based on analysis has created more possibilities for prediction, and the wide application of this prediction in the field of ideological and political education on online education platforms will inevitably improve the effectiveness of education. Under the influence of the network environment, college students actively participate in information acquisition or hot discussion, more autonomous and personalized; in view of this, online education platforms think about politics and education. Education needs to use big data, cloud computing, and other information technologies to increase the collection and analysis of college students' learning data, effectively grasp the thinking characteristics and ideological dynamics of college students on the basis of ensuring security and privacy, and, on this basis, select educational content and education methods in a targeted manner, so as to better meet the characteristics and needs of college students and then achieve efficient development of education.

6. The Construction of a Management Mechanism for Ideological and Political Education Platforms in the Network Environment

6.1. Construction of Guidance Mechanisms. The guidance mechanism of the network ideological education platform refers to the gradual formation of an institutionalized mode of operation through the interaction and integration of educational resources in the process of teaching students to continuously improve their ideological level, political awareness, moral character, and cultural literacy and in the process of achieving great morality, public morality, and strict

TABLE 2: The student model.

Category	Project	
Demographic characteristics related to learning background	Gender	
	School	
	Academic section	
	Subject	
	Major	
Characteristics related to learning style	Physiological dimension	Visual type
		Auditory type
		Kinesthetic type
	Cognitive dimension	Field independent type
		Field dependent type
Characteristics related to learning ability	Learning ability	Very strong
		Strong
		Poor
		Very poor

private morality. Proceeding from adhering to the socialist direction of running schools and the fundamental task of cultivating people with moral integrity, we should grasp the ideological context of students, make them accept the guidance of the network ideological and political education platform, cultivate students' patriotic feelings, sense of social responsibility, innovative spirit, and practical ability, and realize the all-round development of students' morality, intellectual, physical, and aesthetic work. Due to the complexity of the mobile network technology, it poses greater challenges to ideological and political teachers, requiring ideological and political teachers to master advanced information processing technology, learn to effectively screen relevant knowledge, and flexibly apply it to the actual daily ideological and political curriculum education and teaching. In the new era, ideological and political teachers must have a variety of teaching capabilities, make full use of their own teaching knowledge and skills to guide students to selectively absorb relevant information, and learn to use the knowledge and information in the mobile network to effectively study political thinking, and for the problems and teaching knowledge difficulties in learning, they can use Weibo and WeChat to achieve interactive communication with teachers. Teachers can also grasp the learning situation of students in real time, make comments, or carry out targeted education guidance to improve the effectiveness of ideological and political education.

6.2. The Construction of a Sharing Mechanism. The integration of online ideological and political education resources means that various teaching resource modules should be integrated and adjusted with each other, solve the problem of mutual cooperation between various courses and ideological and political courses, form a synergistic effect, and complete the goals of ideological and political education. The construction of the sharing mechanism reflects the educational function, which enables the platform to continuously improve the work system, teaching system, and content system of curriculum ideology around the goal of talent training. Through the integration of goals, functions, and information, we will dig deep into the ideological and political education resources contained in the curriculum

and teaching methods and gradually build a curriculum ideological and political teaching resource system with rich types, progressive levels, and mutual support. Schools should actively adapt to the trend requirements of new media integration, use the decentralized distributed storage and consensus mechanism of block-chain technology, break down platform barriers, and integrate and share scarce and high-quality teaching resources. Teachers can use social media such as Weibo, WeChat, and public accounts and can also use short video community platforms such as Douyin, Kuaishou, and Station B to achieve interactive exchanges between teachers and students and facilitate fierce discussions on ideological and political issues in the classroom. Teachers can also publish some topics or hot topics and news events related to the development of the national situation, give some pertinent opinions or suggestions that are in line with the core values of socialism and world outlook, guide students to participate in discussions, and help students establish a correct world outlook and outlook on life.

For the evaluation of the recommendation results, the user evaluation will start from three perspectives—whether it meets the learning objectives, the learning interest, and the recommendation results and analyze the utility of the recommendation results of different algorithms (the evaluation results), as shown in Table 3. The final ratio in the table is the proportion of the number of users positive. The objective and subjective results show that students have high satisfaction with the improved algorithm, indicating that the degree of personality of the recommended results of the improved algorithm is improved.

6.3. Establishment of Safeguard Mechanisms. The guarantee mechanism of the online ideological and political education platform is based on the objective needs of education and teaching, through organizational management, process management, and safety management, adhering to the unity of theory and practice, combining the offline ideological and political education small classroom with the online ideological and political education classroom and achieving the expected goals of ideological and political education. Once the platform management mechanism is formed, it will
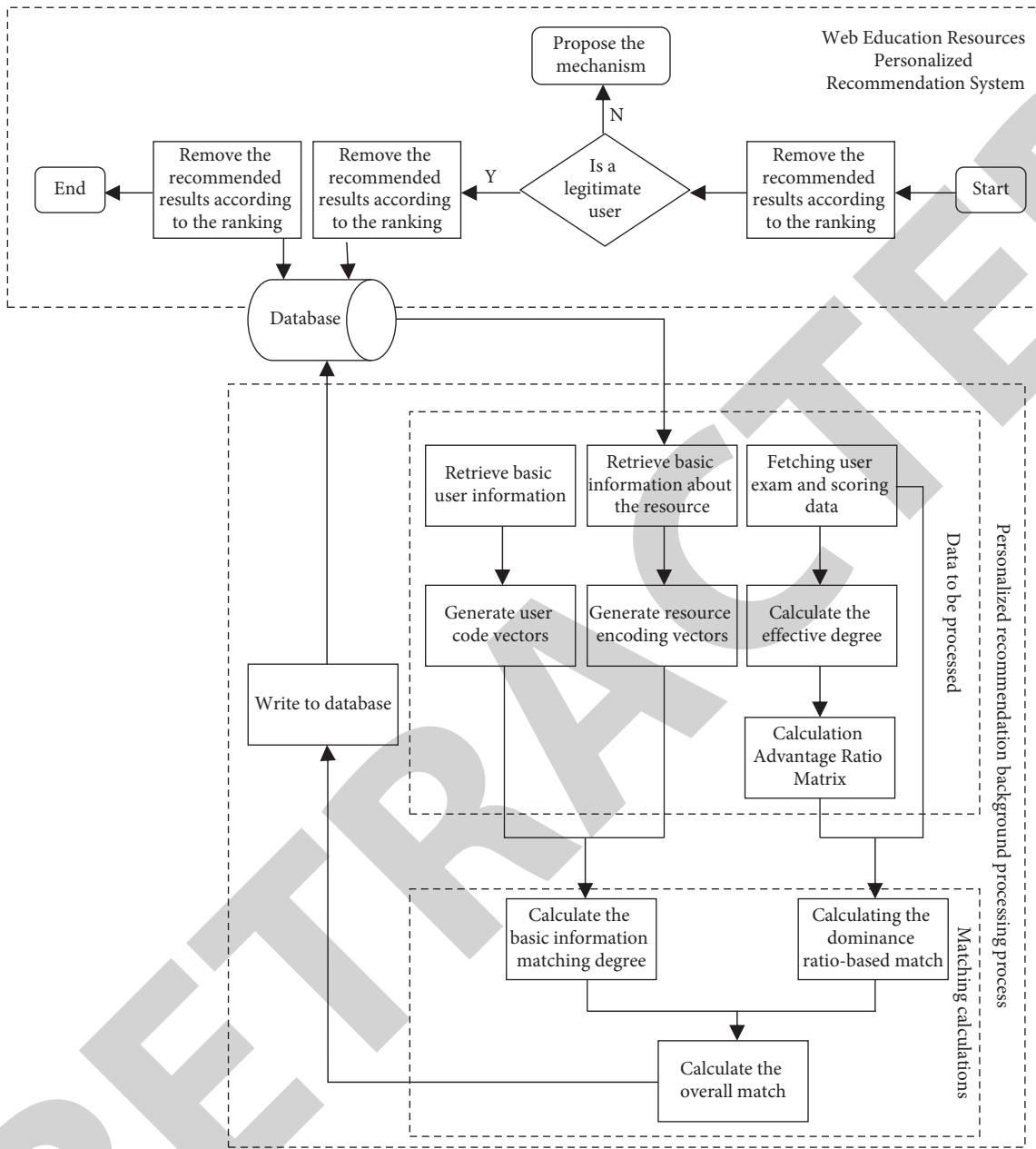
Figure 5: Overall flow chart of the personalized recommendation program for educational resources.

Table 3: Satisfaction analysis.

Recommendation algorithm	Learning objectives (%)	Learning interest (%)	Recommendation result satisfaction (%)
Traditional collaborative filtering algorithm	58.5	68.5	73
Improved collaborative filtering algorithm	70.5	78.5	93

spontaneously and dynamically guide and decide on management behaviors according to certain laws and orders to achieve effective management:

(1) Organizational guarantee: organizational management refers to the establishment of the organizational structure of the platform through design, the

rational allocation of personnel, the formulation of rules and regulations, the clarification of the relationship of responsibility and authority, the provision of the necessary organizational carrier and organizational support for the operation of the platform, the development of management of educators and the educated, the coordination of the

relationship between the two, and the provision of organizational guarantee for the better realization of the goals of ideological education [19]. The relevant functional departments of the school may formulate rules and regulations for online ideological and political education, clarify management responsibilities, coordinate the division of labor in management, coordinate the allocation of personnel, and exert the cohesion of all levels of organizational structures to form a management synergy.

(2) Process management: process management refers to the use of a practical approach to planning, controlling, and improving the effectiveness, efficiency, and adaptability of processes. Institutionalized process management contributes to the smooth operation of the network platform. In order to make the platform operate effectively, the process method should be used to identify the process of interrelation and role between the management responsibility, guarantee responsibility, coordination responsibility, and incentive means of the platform, and implement continuous control and continuous improvement of the connection, combination, and interaction between them, so as to improve the operational efficiency of the network ideological education platform and enhance the satisfaction of the use of the platform.

(3) Safety management: safety management refers to the main use of modern safety management principles, methods and means, analysis, and study of various unsafe factors, from the technical, organizational, and management to take effective measures to solve and eliminate unsafe factors, to prevent accidents. The network security management system that conforms to the law of network development is the institutional guarantee for colleges and universities to have a safe and stable network media environment, and scientific and effective system design can ensure the healthy and orderly development of the campus network of colleges and universities. With the development of the Internet, new media such as Weibo, WeChat, APP clients, and short video platforms are increasingly involved in the operation of new media platforms in colleges and universities, and the intervention of social forces provides a fast and convenient network interaction platform for ideological and political education, while also bringing pressure to the network security management and public opinion monitoring of colleges and universities, requiring colleges and universities to further improve the construction of security systems, so that a sound network security management system can escort colleges and universities in network ideological and political education.

6.4. The Construction of Assessment Mechanisms. The evaluation of the online ideological and political education platform is based on the objectives and requirements of

ideological and political education, on the basis of systematically and scientifically sorting out and analyzing relevant information on ideological and political education and using certain evaluation indicators and methods to measure and evaluate the elements, processes, and effects of ideological and political education. Through teachers, students, content, carriers and environment, and other elements, a comprehensive evaluation of the online ideological and political education platform of colleges and universities is carried out, and its performance, quality, and operational status are evaluated. It is necessary to think whether the educational elements are complete and high quality, whether the comprehensive application of various elements is effective, whether the education program is keep pace in time and real, and whether the system is perfect. It is also necessary to look at the organizational situation of each stage and link in the process of implementing ideological and political education, the transition and articulation between each other, and whether the relationship between subject and object can be correctly handled well in the teaching process and the combination of the leading role of teachers and the main role of students. Furthermore, it is more necessary to examine the actual effects of ideological and political education, which are mainly reflected in the development and changes of students' thinking and behavior. The establishment of the evaluation mechanism of the online ideological and political education platform provides an important basis for strengthening and improving ideological and political work and evaluating the effectiveness of ideological and political education, and its purpose is consistent with the goal of ideological and political education, and in essence, it is to make value judgments on the social and individual effects of ideological and political education [20].

6.5. Construction of Teacher Training Mechanism. Under the background of the new era, ideological and political workers should continuously improve their political quality and network literacy, accurately grasp the convergence point between ideological and political education and information technology, skillfully apply information technology to build a smart teaching platform, and firmly grasp the leading role of online ideological and political education. General Secretary Xi Jinping stressed at the 2019 School Ideological and Political Theory Teachers' Forum that the ideological and political curriculum is a key course for implementing the fundamental task of Lide Shuren, the role of the ideological and political class is irreplaceable, and the teacher team of the ideological and political class has a heavy responsibility. The "Opinions on Strengthening and Improving the Ideological and Political Work in Colleges and Universities under the New Situation" also pointed out: it is necessary to strengthen the construction of the contingent of teachers and special forces. The ideological and political work contingent and the party affairs work contingent of colleges and universities have the dual identities of teachers and managers and should be included in the overall plan for the construction of the contingent of qualified personnel in

colleges and universities, forming a work force that is mainly full-time, combines full-time and part-time work, has sufficient quantity, and has excellent quality. "To improve the training mechanism of the network ideological and political education team, it is necessary to establish a perfect talent guarantee system for the ideological and political teacher team in light of their own actual conditions, study and issue a series of supporting documents and policy measures, and build a high-quality ideological and political work team that combines specialization and combination." It is also necessary to organize education and training, strengthen the practical training of the ideological and political work contingent, improve the incentive mechanism, and promote the professionalization and professionalization of the ideological and political work contingent.

7. Conclusion

All in all, combining the ideological and political education of college students with the advanced and convenient Internet is one of the important ways which brought China from lagging behind to being the first in education. The networking of education has become the trend of the trend, the boundaries of users are also expanding, and colleges and universities should actively pay attention to the changes in the political ideology of college students and the health of the network environment when carrying out ideological and political education for students. Opening up new learning channels for students will help improve the degree of enthusiasm of college students in ideological and political study and can also promote the comprehensive development of contemporary college students.

As the main force in the new era, when the country is becoming more and more open, science and technology are becoming more and more powerful, and the culture is becoming more and more abundant, we must resolutely adhere to the bottom line of our own thinking, choose to accept positive and beneficial culture and information, in order not to lose ourselves in this complicated Internet+ era and to truly add our own strength to this rapidly developing country and society. As a high-quality talent of the country, it is necessary to have good political thinking, establish a correct world outlook, outlook on life, and values, use a wide range of network resources to open up thinking, enrich themselves, and lay a good foundation for entering society in the future. At the same time, ideological and political education in colleges and universities should also keep pace with the times, actively respond to all the adverse effects and consequences brought about by the Internet, and comprehensively grasp the correct use of the Internet by college students through political theory, case publicity, and regular supervision, so as to avoid the negative impact of excessive consumption of the Internet and promote the vigorous development of college students.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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Research Article

The Application Trend of Digital Finance and Technological Innovation in the Development of Green Economy

Ya Zhou 🆔

School of Marxism, Southeast University, Nanjing, Jiangsu 211189, China

Correspondence should be addressed to Ya Zhou; 230189863@seu.edu.cn

Based on the perspective of digital finance and technological innovation, this paper analyzes its application in economic development, green economy, and sustainable development. With the continuous development of technological economy, methods such as artificial intelligence, Internet of Things, big data, and cloud computing become increasingly mature. Economic development is inseparable from the empowerment of technology. In this paper, firstly, we introduce the basic concepts and main forms of digital finance and technological economy and list the cutting-edge technologies including blockchain, VR, sharing economy, and other modes. Then, we analyze the application trend of technology economy. Finally, we analyze the examples of digital finance and technological innovation in detail, including tourism economy, digital marketing, sharing economy, smart city, digital healthcare, and personalized education, three hot topics of technology intersection and integration. In the end, we put forward prospects for the development of a digital economy, digital finance, and technological innovation.

1. Introduction

In 2020, the added value of the digital economy in 47 countries reached US $32.6 trillion, up by 3.0 percent year-on-year in nominal terms and accounting for 43.7 percent of the GDP. The digital economy in developed countries is large in scale and accounts for a high proportion. In 2020, the digital economy reached US $24.4 trillion, up by 3.0 percent year-on-year and accounting for 54.3 percent of the GDP. The digital economy in developing countries is smaller at $8.23 trillion and growing faster, reaching 3.1 percent in 2020. The US continued to be the world's largest digital economy, with a size of US $13.6 trillion in 2020, while China ranked second with a size of US $5.4 trillion. Germany, Japan, and the UK ranked third through fifth with $2.54 trillion, $2.48 trillion, and $1.79 trillion, respectively. In the development of the digital economy, developed countries have advantages over developing countries.

As early as 1912, Schumpeter made a preliminary study on the relationship between financial development and technological innovation [1]. However, it was not until the promotion of financial marketization and the development of the third scientific and technological revolution that the study of the relationship between financial development and technological innovation formally attracted the attention of scholars at home and abroad and became a hot topic of academic debate [2, 3]. With the development of physical finance and the arrival of the third wave of scientific and technological revolution, finance in a new form of digital valuation is active in the public vision. In a short period of more than 10 years, digital finance research is in the ascendant. At present, technology-innovative enterprises are facing serious financing constraints, which can be roughly attributed to the following reasons. First of all, technology-innovative projects are characterized by long investment cycles, large capital input, high risk, high transaction cost in traditional financial markets, overall planning mode of capital-lending projects, and cumbersome review process, which may lead to the enterprise's innovation projects missing the best research and development period due to the fracture of the capital chain. Secondly, the information asymmetry between money

supply and demand restricts the external channels of enterprise development and financing. Traditional financial intermediaries cannot participate in innovative projects, nor can they prevent moral hazard problems that enterprises may face by establishing an effective mechanism of money supply pre review, event tracking and post supervision [4]. Finally, the poor quality of enterprise credit guarantee may also lead to the financing constraints of technological innovation enterprises. In the traditional financial market, representative financing channels such as banks generally require enterprises to provide collateral with strong realizable value, while innovative enterprises have a low proportion of tangible assets, weak mortgage ability, and low financing availability. For technological innovation activities, the lack of effective financial support may lead to the "flow of production" of a large number of innovative projects, which inhibits the improvement of regional innovation efficiency, and is ultimately not conducive to the optimization and upgrading of China's industrial structure and the establishment of an innovative country [5]. Digital finance, as a brand new form of financial industry, with its "inclusive" concept and "grass-roots" characteristics, may be in line with the characteristics of financing needs and innovation environment of technology-innovative enterprises.

Recently, the academia and the industry put forward the "wisdom city" and the concept of "environmental protection" wisdom [6]. "Environmental wisdom" is the extension of the development of "digital green" and the deepening of the Internet and information technology in the field of environmental protection. On the basis of "digital environmental protection," the "environmental protection wisdom" adds intelligent sensing system equipment in the front-end application, uses various information and communication technologies, and integrates the environment Internet of things through cloud computing, virtualization, and mainframe computers [7]. Building a new generation of network "smart" environmental protection systems integrating strong perception ability [8], intelligent processing ability, and comprehensive management ability provides more dynamic and accurate support for environmental management and decision-making, and digital environmental protection is the foundation of intelligent environmental protection. Compared with the traditional urban environmental governance mode, realizing the digitization and networking of environmental monitoring equipment is the basis of intelligent environmental protection. Although smart environmental protection and smart city construction are the inevitable trends of historical development, the practice of smart environmental protection in smart city construction is not plain sailing. Smart city construction brings both opportunities and challenges to the environmental protection industry. How to better realize the intelligent environmental protection in smart city is a major problem facing the world today. China, as a developing country actively advocating smart environmental protection and environmental protection city construction, should make efforts to find the reason.

2. Technology Trends

Big data has 3 V characteristics of variety [9], volume [10], and velocity [11]. Due to the integration and innovation of big data and different industries, the operation and service modes of traditional industries have changed, and new platforms, new models, and new business forms have been derived, such as Internet finance and car sharing. Finally, mass entrepreneurship and innovation is accelerating with the sharing and opening of big data. The digital economy is accelerated by technological innovation and technology-driven economic innovation. With the acceleration of big data technology and the integration of various sectors of the social economy, traditional industries can improve their productivity and innovation capacity and realize their digital transformation.

2.1. New Development Trend of Blockchain. The essence of blockchain is a distributed accounting synchronous updating ledger technology that collectively maintains a reliable database in a decentralized and trustless way. As the underlying technical support of Bitcoin, blockchain is essentially an imtamable distributed ledger, as well as a brand new distributed infrastructure and computing paradigm. Its basic ideas include using distributed networks to realize decentralized information processing, using consensus mechanism to establish trust between nodes, using asymmetric encryption and redundant distributed storage to realize information security, and using blockchain data structures to realize data information traceability.

In the era of digital economy, the development trends of blockchain are as follows: First, the virtual blockchain will be transformed into a real blockchain. Speculative currency speculation will cool, and blockchain's trust-building features will be taken seriously and applied to the real sector to promote the efficiency of the real economy. Second, cross-fusion. Blockchain will further accelerate the integration with new digital technologies such as big data, the Internet of things, and artificial intelligence. The development of blockchain technology and applications requires big data, the Internet of Things, artificial intelligence, and other next-generation information technologies as infrastructure support to expand the application space. Meanwhile, the development of blockchain technology and application plays an important role in promoting the development of the new generation of information technology industry [12]. Third, standards-led blockchain development will be more standardized. Blockchain in the industry has seen rapid development, but due to the differences in the industry, between users, the lack of uniform standards, the duplication, and waste of resources, in February 2018, China's ministry of industry of the chain block data format specification marked the blockchain technology standardization stage in essence.

Although the development and application of blockchain technology are relatively limited at present, the technology of blockchain is far from mature, and there are still many problems. However, with the increase in blockchain into future, chain blocks and the combination of the

digital economy will increasingly close; the digital economy management platform based on blockchain is expected to become a public data sharing management infrastructure, and blockchain technology will gradually become the mainstream of the application; from the financial sector to the non-financial sector penetration, it will gradually become a new demand that subverts the traditional industry development.

2.2. New Development Trend of VR. VR is based on data acquisition, computer three-dimensional graphics technology, multimedia technology, interpersonal interaction technology, network transmission technology, three-dimensional display technology, and other technologies, all integrated to develop a new technology. As the digital economy continues to evolve, big data can provide granular support for immersive virtual scene, while virtual reality provides rich visualization solutions for big data. In this way, people's ability to analyze and process interactive big data is enhanced.

In the era of digital economy, the development of virtual reality technology has brought new industrial changes and business opportunities. Digital economy has driven the application and development of virtual reality in industrial design, virtual shopping, psychological therapy and rehabilitation, military simulation, and other fields. MIT Multimedia Experiment Center, Virtualitics, and other research institutions apply big data technology to VR scene construction to solve the problems that traditional 2D and 3D visualization systems are not capable of processing due to complex datasets, giving full play to the innate advantages of VR (immersion). The rollercoaster virtual space is based on NASDAQ data, allowing passengers to experience NASDAQ's rise and fall in the past 21 years from a first view. Master of Pie demonstrated how VR can be applied to big data analytics, where data are presented in a more natural and immersive way, allowing users to analyze and modify data in real time. According to Forbes, big data researchers using the technology can see four times as much information as a traditional computer screen "at a glance."

2.3. New Trend of Sharing Economy Development. The rapid development of mobile internet has rapidly spawned a new business model based on big data, cloud computing, and third-party payment, namely the sharing economy. The essence of sharing economy is to eliminate sellers in the traditional sense, and it is digitalization that drives the progress of the elimination process. Digital technology makes it interact in the transaction process in the form of point-to-point connection, so as to improve the availability of services, reduce transaction costs, and enable consumers to enjoy the characteristics of productive services [13]. For example, in terms of shared travel, bike-sharing and car-sharing are developing rapidly. Didi Chuxing's operation data in 2017 show that in 2017, there were more than 20 billion route planning requests per day and more than 4500 TB of data were processed per day. Data analysis can help smart travel, achieve green travel, and improve urban

planning. When it comes to housing, Airbnb has more than 120 million listings in more than 190 countries, and based on that data can accommodate an average of 400,000 people a night. The rapid development of sharing economy accelerates the growth of the digital economy. Based on the massive data generated by sharing economy, accurate matching is achieved through analysis and prediction, which accelerates the development of sharing economy. At the same time, based on the massive data generated by the sharing economy, the status quo and changing trend of urban transportation, employment, education and medical care, and other livelihoods can be interpreted, providing the decision-making basis for urban development. In the future, sharing economy will further expand its dimensions and service chain, carry out derivative services, promote more cross-border cooperation and innovation, and gradually spread to various industries, especially key fields such as education and medical care. At the same time, the sharing economy will gradually develop into the whole process, from consumption and production to distribution and circulation.

2.4. New Advancement Pattern of Internet of Things. With the vigorous development of the Internet of things, a variety of sensors and terminals can quickly access the network and gather together. At the same time, the number and structure of Internet devices have increased sharply at the same time, from PC to mobile phone, from tablet to the era of Internet of things. This development leads to the urgent need to measure unstructured information. It is assessed that there will be 50 billion associated detecting gadgets in 2020, producing 2.5 million terabytes of information each day, 2.38 times more than the ongoing Internet. The mix of the Internet of Things and the advanced economy has sped up its application in regions, for example, clinical observing frameworks, savvy home machine control, and operations and production network following. The fundamental advancement patterns of the Internet of Things in the computerized economy time are as per the following: First, sensor innovation is creating towards high accuracy to advance all over information assortment and transmission. The fame of wearable gadgets advances the portability of the Internet of Things, and high-accuracy sensor innovation works on the awareness and precision of observing. Second, it can combine with savvy gadgets to advance the mental prowess of the Internet of things. During the time spent on savvy gadget control, the observing information of shrewd watches/wristbands in wearable gadgets can be sent to the medical clinic progressively to understand the ongoing checking administration of the client's body and stay away from the event of related illnesses. Third, the Internet of Things' biological system has turned into the principal type of utilization landing. IT goliaths have additionally organized the IoT biological system in a steady progression. For instance, Apple has framed a multi-stage IoT environment including shrewd home HomeKit, wearable gadget HealthKit, and vehicle IoT CarPlay. Google proposed Project IoT and delivered the Brillo IoT fundamental

working framework. Huawei has delivered Lite OS, a lightweight Internet of Things working framework, and NB-IoT, a start to finish answer for constructing an Ocean Connect environment.

2.5. New Patterns in AI Advancement. With the collection of computerized assets, the improvement of processing power, and the improvement of organization offices, the flood of huge information has turned profound gaining and man-made brainpower from a fantasy into the real world, and man-made reasoning is entering another phase of cross-line combination, with profound application and driving turn of events. In the field of biometric acknowledgment, the FACE dataset (NGI) developed by the Federal Bureau of Investigation (FBI) has gathered 117 million American grown-ups' fingerprints, iris, face, and other biometric information. Face acknowledgment innovation can be utilized to figure out the objective through photographs. In the clinical field, man-made reasoning innovation can be utilized to handle the gigantic information and data gathered to figure out the pertinent obsessive premise and important cases, and work on the precision of conclusion and navigation. Then, the innovation of computer economy and human consciousness will be more focused on deep learning and artificial intelligence, key innovation. Accelerate the application of computer reasoning in currency, clinical and program driven, and turn it into common sense, thus promoting a new round of modern transformation.

3. Technological Cross and Integration in the Era of Digital Economy

Digital economy is most rapidly developing in modern times; innovation is the most active and most widely emerging economic activity; its core elements are the data resources, the key technology of data mining, and utilization of resources; its essence is the large data, cloud computing, Internet of things, artificial intelligence, and blockchain: five new digital technologies leading the digital transformation.

Big data technology promotes the sharing economy enterprise's innovation and development, but has many problems, such as information security, privacy, and poor regulation; relying only on big data sharing technology has made it unable to maintain the innovation of new economic models, and blockchain technology has encryption sharing; distributed books do not tamper with the advantages. It provides new technical support for the circulation and sharing of data and can be complementary with big data technology. Blockchain technology in the era of big data has three characteristics: First, the mass storage of big data and distributed computing technology improve the value and use space of blockchain data. With its reliability, security, and imtamability, blockchain provides a strong guarantee for the open sharing of big data under the premise of privacy protection, freeing more big data. Second, blockchain has traceability features, which can effectively improve data quality. Blockchain can record every step of data processing

in detail, including data collection, transaction, circulation, and computational analysis, such that the quality of data has a strong trust endorsement. Third, blockchain can standardize the use of data and fine-tune the scope of authorization. Data trading and circulation after desensitization can prevent the formation of information islands and promote the gradual formation of globalized data trading scenarios; the effective combination of digital economy with blockchain and Internet of Things will also lead a new round of economic revolution [14, 15].

3.1. The Integration of New Digital Technologies Promotes the Innovative Development of the Digital Economy. Digital economy is most rapidly developing in modern times; innovation is the most active and most widely emerging economic activity, and its core elements are the data resources, the key technology of data mining, and utilization of resources; its essence is the large data, cloud computing, network, artificial intelligence, and blockchain—five new technologies leading to the digital transformation of the economy. New digital technologies have profoundly changed the way of thinking, production, and the life of mankind, making economic digitalization an important driving force for innovative economic development.

4. Application Innovation Trend in the Digital Economy Era

"Tmall International," with more than 40 million service users, accounted for half of the online shopping market in China. In this retail ecosystem, relying on the Internet and big data, Tmall International relies on Alibaba's powerful data ecosystem to help a large number of overseas merchants to break through the brand online and offline system and establish a global supply chain. Brand operators, such as Australian natural health brand Swisse, share data with Alibaba to predict consumer buying trends and potential demand [16]. Figure 1 shows the new retail applications in the digital economy era.

The fresh market of new retail has become a trillion-level market, and each giant has taken the lead. "Hema Xiansheng" is a typical representative. It uses digital technology and comprehensive performance links in the supply chain, sales, and logistics to achieve full digital, intelligent, optimized workflow, reduce ineffective work, to shop for their goods, shelves, picking, packing, distribution and other tasks, homework personnel and assignments, which can be identified by intelligent devices; the error rate is extremely low, and the whole system is divided into foreground and background. Users place orders within 10 minutes of sorting and packaging, and it takes 20 minutes to achieve delivery within 3 km.

4.1. Digital New Technology Leads to Production and Manufacturing to Realize Intelligent Production. The IoT combines artificial intelligence, cloud computing, and big data analytics to analyze the collected data through a large
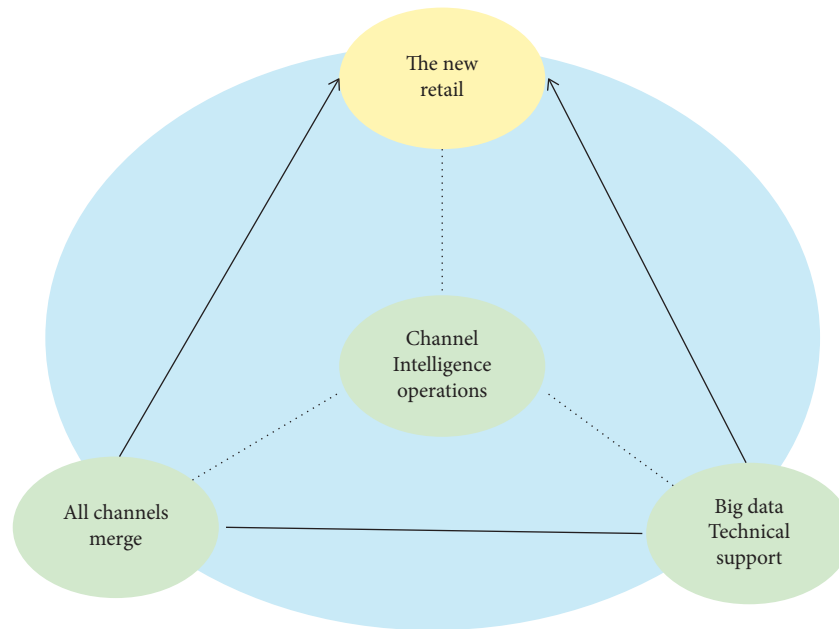
FIGURE 1: New retail applications in the digital economy era.

number of connected sensors that can monitor complex physical and mechanical performance in real time to optimize production and perform proactive maintenance, improving efficiency and generating information that can be used to develop new processes. The data collected can also be used to analyze other relevant areas beyond manufacturing, such as reducing energy consumption and network resource investment. In product production planning and process control, the factory in the production process using smart devices and sensors to collect the production process to produce large amounts of data, dig into these data and applications, and optimize processing methods, processing sequence, and system technology indexes such as cutting parameters, the real-time monitoring of production process, troubleshooting, and feedback adjustment.

4.2. Digital New Technology Leads to Operation Optimization and Achieves Lean Management. The production process, equipment working conditions, process parameters, and other information can be collected in real time through the Internet of things, and product quality and defects can be detected and counted. In the offline state, machine learning technology is used to mine the relationship between product defects and the historical data of the Internet of Things and form control rules. In the online state, through enhanced learning technology and real-time feedback, it can control the production process to reduce product defects. At the same time, it can integrate expert experience to continuously improve learning results. In the maintenance service link, the system uses sensors to monitor the status of the equipment and establishes an analysis model of the equipment failure through machine learning. Before the failure occurs, the workpiece that may fail is replaced, so as to ensure the continuous trouble-free operation of the equipment. In terms of supply chain management and

optimization, enterprises can use geographic big data analysis technology to integrate and optimize supply chain distribution networks, optimize purchase time, purchase quantity, warehouse allocation, etc., to improve inventory efficiency. In the field management optimization, artificial intelligence can also be used in digital field equipment life cycle health management, machine vision-based field safety, field environmental management, etc.

4.3. New Trend of Smart City Application. The wisdom of the city's development is inseparable from the urban informatization infrastructure construction; infrastructure to collect and record large data resources for professional analysis and management decision support is needed; blocking the use of chain technology to a certain extent can solve urban problems such as data storage and safety. McKinsey predicted in a research report based on western industry data that the application of big data would save more than 100 billion euros in operating costs for the governments of European developed countries and make the Medical insurance of the United States health sector costs reduce by 8 percent, saving more than US $300 billion annually.

4.3.1. The Scientific Development of the Urban Economic Structure, Spatial Structure, and Social Structure Will Be Realized by Digital New Technology. Specifically, in urban planning, big data, as an important strategic asset, is conducive to the cultivation of a new concept of urban planning combining "top-down" and "bottom-up" approaches, and can promote the realization of a new trend of integrating GIS-based urban planning system into urban planning. Innovative data acquisition and processing technologies, onsite research methods, new methods of programming, public participation in planning, and new methods of urban

planning will eventually make smart city planning reach a new height and form a progressive smart city planning system.

4.3.2. Digital New Technology Can Achieve Accurate Management of Urban Social Order, Ecological Environment, and Infrastructure. The intelligent perception and recognition technology of artificial intelligence can be used to collect and coordinate urban traffic, logistics, energy, environment, and other information in real time. According to the data-driven formation of urban decision-making mechanism, digital intelligent management of the city finally realize the intelligent allocation of public resources. Using artificial intelligence technology, it can automatically digest the unstructured massive surveillance video data generated by the security industry that cannot be calculated statistically. At present, artificial intelligence has penetrated into every industry and department to varying degrees. By collecting data in various fields, it can make intelligent analysis and effectively use urban information, enhance the efficiency of urban management, save resources, protect the environment, provide decision support for sustainable development, and promote the construction of smart cities.

4.4. New Trends in Mobile Medical Applications

4.4.1. Digital New Technology Helps Chronic Disease Prevention and Health Management. Based on the Internet of things, a national public health monitoring platform will be built. Health departments can strengthen continuous medical observation, timely discover potential disease risks, and give early warning and prevent chronic diseases and epidemics through the electronic medical record database covering the whole country. In addition, patients' personal data, electronic medical records, and ethnic database in China can also be used to quickly detect diseases and identify the causes [17], so as to build personalized rehabilitation treatment programs suitable for Chinese people. In the field of practice, "Shuangquan (comprehensive screening and whole-process management) Plan" and Google's "Global Influenza Map" are important manifestations of big data in the management of mass prevention and treatment of chronic diseases and the prediction of high incidence areas. Finally, by combining the Internet of Things with blockchain, all kinds of medical equipment and services can be connected to monitor residents' and patients' exercise and health data, and obtain fitness, medical, physical, and exercise monitoring data. The anonymity of blockchain ensures patients' privacy. At the same time, it can get through the information channel between hospitals, financial insurance, pharmaceutical factories, and other relevant departments.

4.4.2. New Digital Technologies to Assist Clinical Decision-Making. Artificial intelligence technology is used to analyze diverse, multi-source, fragmented, and unstructured medical data, and to support clinical decision-making through a series of means such as etiology identification, clinical data comparison, clinical decision support, and remote patient data analysis, so as to achieve precision medicine. In terms of clinical data comparison, the best treatment approach can be obtained by matching the medication status of patients with the same type. In clinical decision support, deep learning and other methods are applied on medical datasets to realize intelligent diagnosis and treatment.

4.4.3. Digital New Technology to Assist Medical Research and Development. Big data can be integrated into every stage of medical research and development, play a key role in every link of research and development, and can liberate the pharmaceutical research and development industry from the dilemma of high investment, high risk, and long cycle. Through data summary and analysis, the influence of big data on the whole process of drug R&D can be reflected in three stages: In the stage of drug project approval, we used big data to find drugs urgently needed in the market, quickly analyzed pre-clinical trials of drugs, identif effective target drugs, and analyzed technology to process drug data (for example, there are nearly 30 diabetes drugs in the market around the world, and each drug has about 20,000 pages of literature). In the stage of drug development, chemical structure big data can be used to quickly establish chemical structures or carry out targeted structural transformation, compare pharmaceutical processes, and optimize pharmaceutical processes. In the stage of clinical trials, big data of clinical trials can be used to establish pharmacodynamic models, evaluate efficacy, predict adverse reactions, and speed up clinical trials.

4.5. New Trend of Personalized Education Application. The new digital technology is the scientific power to promote the innovation and development of education. Educational big data is a collection of all the data generated in the whole process of educational activities and collected according to the needs of education for educational development and can create huge potential value. Driven by big data in education, new digital technologies such as blockchain and artificial intelligence are becoming a subversive force to promote innovation and reform the education system. Compared with traditional education, the realization of personalized education application depends on the application of new digital technology in the following aspects.

4.5.1. New Digital Technologies Help Learners Discover and Develop Their Potential and Improve Their Academic Performance. Artificial intelligence and learning science are combined to form a new field, Educational Artificial Intelligence (EAI). At present, a large number of educational AI systems have been applied in schools. These systems integrate educational AI and educational data mining (EDM) technologies (such as machine learning algorithms) to track students' behavioral data and predict their learning performance to support personalized learning. Through artificial

intelligence, "teaching, learning, and evaluation" can be organically combined. Schools and other institutions can automatically mark learning materials through NLPs and other artificial intelligence technologies to evaluate students' knowledge points, realize real-time feedback and accurate review, and realize collaborative supervision and self-supervision to promote learning. For example, the American KHAN system can clearly see students' learning progress, knowledge mastery, and teacher's recommendation.

4.5.2. Digital New Technology Helps Teachers Determine the Most Effective Teaching Method and Optimize the Teaching Process. Big data matching algorithm helps to realize learning recommendation, analyze learning data and course data, and can also be used to realize adaptive learning. For example, Knewton company of the United States has used big data to provide digital course materials, which has realized dynamic and continuous adaptation to the unique needs of each student. As Internet technology continues to penetrate into the education industry, big data behavior analysis means are constantly promoting traditional education from statistical analysis for groups to behavior analysis for individuals. After acquiring big data, on the one hand, intelligent means, such as association analysis and recommendation algorithm, can be used to customize personalized teaching contents and methods, automatically discover rules and use them for prediction. For example, "Xuetang Online" can dig into the value of MOOC and adjust courses accordingly. On the other hand, according to online and offline data analysis, it can timely guide students to solve problems. Real-time feedback of learning data is beneficial to explore students' interests and characteristics, so as to realize the exchange of online and offline data, realize supervised learning, judge the degree of knowledge mastery of students, and timely modify teaching ideas and methods.

The new digital technology helps realize the mode of two-way education delivery. Using virtual reality technology, teaching content can be organized according to their own ideas and knowledge structure can be constructed, and this organization information is not a simple linear structure. Virtual reality technology connects these complicated knowledge into a network, providing students with a vivid knowledge structure. It includes not only the basic content of the subject, but also the logical relationship between the contents of the subject. It pays attention to both the formation process of knowledge and the structure of knowledge. Through the coordination of our vision, hearing, and touch, the unity and flexibility of the teaching content can be perfectly combined. For many abstract concepts and things, virtual reality can be restored to real scenes, allowing students to try different experiments, or even simulate micro scenes, to explore the essence of things or phenomena, without worrying about any danger.

4.6. New Trend of Region-Wide Tourism Application. With the arrival of the era of mass tourism, the new digital technology is playing an increasingly important role in the tourism industry. The development of region-wide tourism no longer depends on perceptual experience, but needs to rely on new digital technologies to make decisions.

(1) LBS, search engine, online travel agency (OTA), and other tourism data can help the tourism industry's market segmentation and positioning. Specifically, the tourism climate index can be used to predict the future growth of the tourism market. Through the analysis of tourists' preference, the tourism market is segmented. Through the analysis of tourist source, one can judge the distribution of main tourist source markets. Through the analysis of potential markets, we can explore the depression of regional tourism markets and through the analysis of the loss of tourists, we can improve the tourism market conversion rate.

(2) Based on the Internet of Things technology and cloud computing platform, we can integrate various tourism-related businesses and professional resources, acquire big data, analyze, integrate, and share the obtained data accurately, and provide strong support for tourism managers to make decisions and meet the personalized needs of tourists. For example, the construction of user portraits, personalized tourism strategy recommendation, innovation of traditional tourism department's organizational forms, including personalized recommendation matching destinations, tourist attractions and routes, personalized recommendation of hotels and locations, personalized recommendation of direct flight or transfer, and personalized recommendation of popular food and shopping sites can be achieved. TripAdvisor has done well in this area. As the world's leading travel planning and booking site, it catalogues more than 500 million reviews and recommendations from travelers around the world, covering 7 million homes, restaurants, and attractions in more than 190 countries.

(3) Based on weather, hotel, traffic, and other data, one can realize the number of tourists forecast and safety warning. Deeply analyze the daily, weekly, seasonal, and holiday traffic characteristics of the scenic spot, as well as the impact of weather, traffic, and historical traffic data on the scenic spot, and then control the distribution of tourists in the scenic spot in real time according to the scenic spot forecast and legal holiday traffic, so as to effectively prevent tourists from crowding and stampede in the scenic spot.

5. Conclusion

Based on the perspective of digital finance and technological innovation, this paper analyzes its application in economic development, green economy, and sustainable development. With the continuous development of technological economy, methods such as artificial intelligence, Internet of Things, big data, and cloud computing become increasingly mature. Economic development is inseparable from the empowerment of technology. At present, China is still facing

various difficulties and problems in economic development and application, and hence we should make full use of the information advantages of new digital technology, form subversive technological change, and expand the application of advanced technology in depth, so as to promote the development of the digital economy.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding this work.

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Retraction

Retracted: Research on the Implementation Path of Ideological and Political Education in Private Colleges and Universities under the Network Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] D. Luo, "Research on the Implementation Path of Ideological and Political Education in Private Colleges and Universities under the Network Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 2830388, 12 pages, 2022.

Research Article

Research on the Implementation Path of Ideological and Political Education in Private Colleges and Universities under the Network Environment

Da Luo [ID]

Software Engineering Institute, Guangzhou 510990, China

Correspondence should be addressed to Da Luo; ld@mail.seig.edu.cn

Entering the network information age, all kinds of excellent and backward ideas and value orientations coexist on the network, and social trends of thought are diverse. Therefore, colleges and universities need to occupy the network position, expand the educational position from the platform to the network world, and better lead the Ideological and Political Education (IPE) of college students. Therefore, this paper takes the practice of IPE in China's Private Colleges and Universities (PCU) under the network environment as the research object. Firstly, this paper expounds the definition of PCU and briefly introduces the basic theory of IPE of college students. Secondly, it investigates the current situation of students' IPE under the network environment and analyzes the implementation path. Finally, through research and argumentation, the current situation and influencing factors of IPE in PCU are clarified, and countermeasures and suggestions are provided for online teaching in universities.

1. Introduction

PCU shoulder the important mission of educating talents for the country and the party together with public colleges and universities [1]. Network IPE has become the most important in PCU [2]. College students, as the new people of the times, the party, and the state have the inescapable responsibility and obligation to IPE of college students. In the late 1990s, scholar Zhang Jiansong [3] proposed that "the network ideological and political work of PCU actually implements ideological and political work on students through the campus network."

Nowadays, the living environment of college students is much richer than that of primary and secondary school students. Born as a person, the perception of natural environment and social environment will affect every student's thoughts and values. If we want to establish correct values and outlook on life, we must carefully perceive all the surrounding environments. From a philosophical point of view, the influence of environment on human thought is ubiquitous. In order to deliver better ideological and political courses to college students and guide them to correctly perceive nature and the environment, it is essential to proceed education reform.

"Online learning" is a method of learning through the Internet without any restrictions on location [4]. During the epidemic period, online teaching has been widely used to achieve normal teaching tasks under the premise of safety [5]. IPE courses also quickly set up online classes, timely propaganda of epidemic prevention, and control knowledge. Interpret the spirit of the important instructions of the government in epidemic prevention and control work from multiple perspectives and levels, and actively publicize the story of fighting the epidemic.

The development of IPE needs to rely on the orientation of the times, grasp the "times, moderate, effective," and further construct a more targeted and contemporary theoretical and practical system [6]. On the other hand, network technology needs to be combined with the traditional advantages of IPE to become the new vitality of education [7]. The following is the number of Chinese Internet users according to official data (see Figure 1).

Number of Chinese Internet users
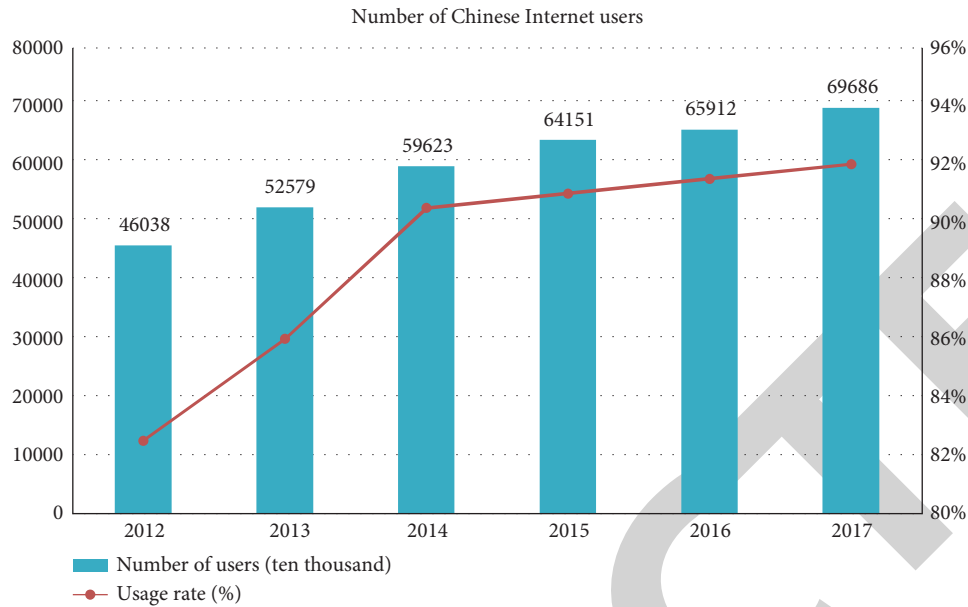
Figure 1: Internet users and internet penetration.

From Figures 2 and 3, it is not difficult to find that in 2016, the age group of Internet users in Internet penetration rate is 20 to 29 years old, accounting for 30.5%. In terms of education level, the highest percentage of Internet users is middle school and above, accounting for 85%.

Through data analysis, it is not difficult to find that most groups using the Internet are young people, and most of them have received secondary education or above. Therefore, it is important to study the practical path of IPE in China.

The innovations of this paper are as follows:

(1) It expounds the definition of private colleges and universities and briefly introduces the basic theory of ideological and political education of college students.

(2) It investigates the current situation of students' ideological and political education under the network environment and analyzes the implementation path.

(3) It clarifies the current situation and influencing factors of IPE in PCU and provides countermeasures and suggestions for online teaching in colleges and universities

This paper consists of five main parts: the first part is the introduction, the second part is state of the art, the third part is the methodology, the fourth part is the result analysis and discussion, and the fifth part is the conclusion.

2. State of the Art

The first official document put forward by PCU in China is the Interim Provisions on the establishment of PCU, which was issued in 1993 [8]. PCU refer to various social organizations and individual citizens other than state organs and state-owned enterprises and institutions, which raise their own funds and set up higher academic education institutions in accordance with the provisions. According to the regulations, the schools funded by domestic social organizations and individuals that are not national institutions in China are called "private schools," and the education carried out is called "private education." According to the students' age and academic background, private education in China can be divided into six categories: private preschool, private compulsory, private high school, private secondary vocational, private colleges, and training institutions. The private education mentioned in this study is all private higher education except for special reference. The "Private Education Promotion Law" issued that private education is also public welfare education, equal to public education. In China, universities are usually divided into two types: general higher education schools and private general higher education schools (i.e., PCU) [9].

In this study, the definition of "ideological and political education" refers to the comprehensive education implementation process of comprehensive participation and implementation for college students through curriculum education, network education, and other comprehensive education systems [10].

The academic circle has a relatively unified interpretation of "IPE," which is put forward by a scholar. "IPE refers to the purposeful, planned, and organized influence exerted by a society or social group on its members with certain ideological concepts, political viewpoints, and moral norms [11] so that they can form social practice activities that meet the ideological and moral needs of a certain society and a certain class."

Nowadays, the Internet has become indispensable in the student groups of PCU in China, and the influence has also begun to be paid attention to.

Network education students are educated, the teacher is the educator, under the help and guidance of educators,
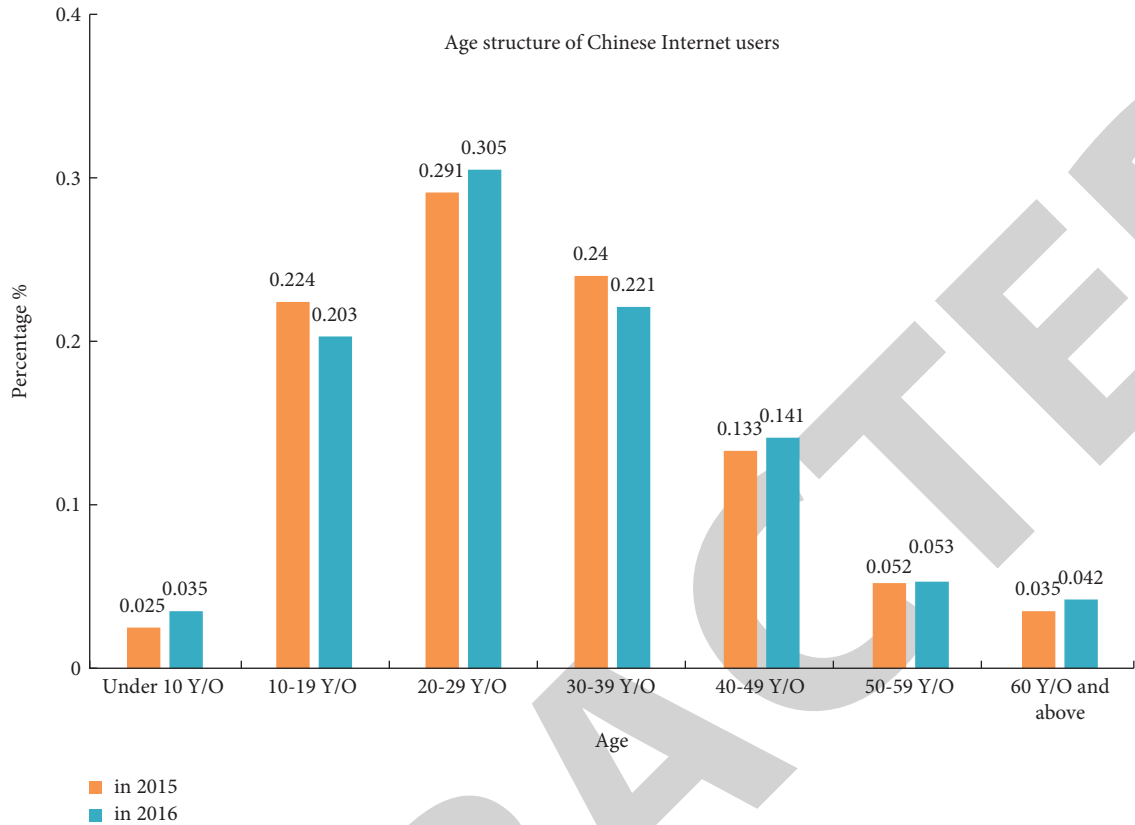
Figure 2: Age structure.

through the network to learn [12]. Network provides advanced teaching methods and rich teaching content, which is a brand-new education model. Its main characteristic is to rely on the network technology as a teaching method, on the Internet directly transregional a new interactive teaching mode. Modern distance education also relies on the network to achieve better benefit.

As for the definition of network IPE, many scholars have put forward their own views from their own perspectives [13]. The definition given by scholar Liu Mei [14] is that "network IPE is a new theory to realize ideological propaganda based on the theory of communication and realize the purpose of education through network technology." This is the earliest definition elaboration in our country. In fact, there is a partial problem in the explanation of this concept. It does not give real-time guidance to people who use the network but explains how to use the network in the way of using tools. Therefore, this concept cannot be completely generalized. In recent years, China has begun to attach importance to this field, and many scholars have also begun to devote their energy to research. Scholar Yang Liying [15] believes that "Network IPE firstly takes the network as the carrier and uses communication and ideological propaganda theories to carry out education, which has become a mode of IPE adapted to the contemporary era." A scholar [16] also gave his own view: "to realize network ideological and political education, we must grasp the internal characteristics of the network and make a large-scale and planned impact on college students' IPE and moral norms through

the network so as to make their morality meet the social needs." In short, many scholars have given their own opinions on the connotation of IPE for college students from different heights, which also provides a direction for PCU to fully understand the nature of IPE for college students under the network environment.

3. Methodology

3.1. The Current Situation of Internet Information Use among Contemporary Students. More than 90% of Chinese college students surf the Internet, and nearly 50% of them surf the Internet frequently [17]. Therefore, we can see that the Internet has gradually entered into people's daily life, from value orientation to behavior mode, from moral thought to psychological development, it brought a huge impact on students' daily life.

Universities are the experiencer and promoter of informatization tide, and the development frontier of "network" in our society. It has become an urgent problem to explore how to strengthen the IPE of college students under the network environment [18]. The age distribution and education level of Chinese netizens are shown in Figures 4 and 5.

As can be seen from the graph above, the group between the ages of 18 and 29 accounts for the highest proportion of Internet users. Among Internet users, those with college degree or above account for 47.1%. College students, as the elites of the times, are also the forefront of

Education structure of Chinese Internet users
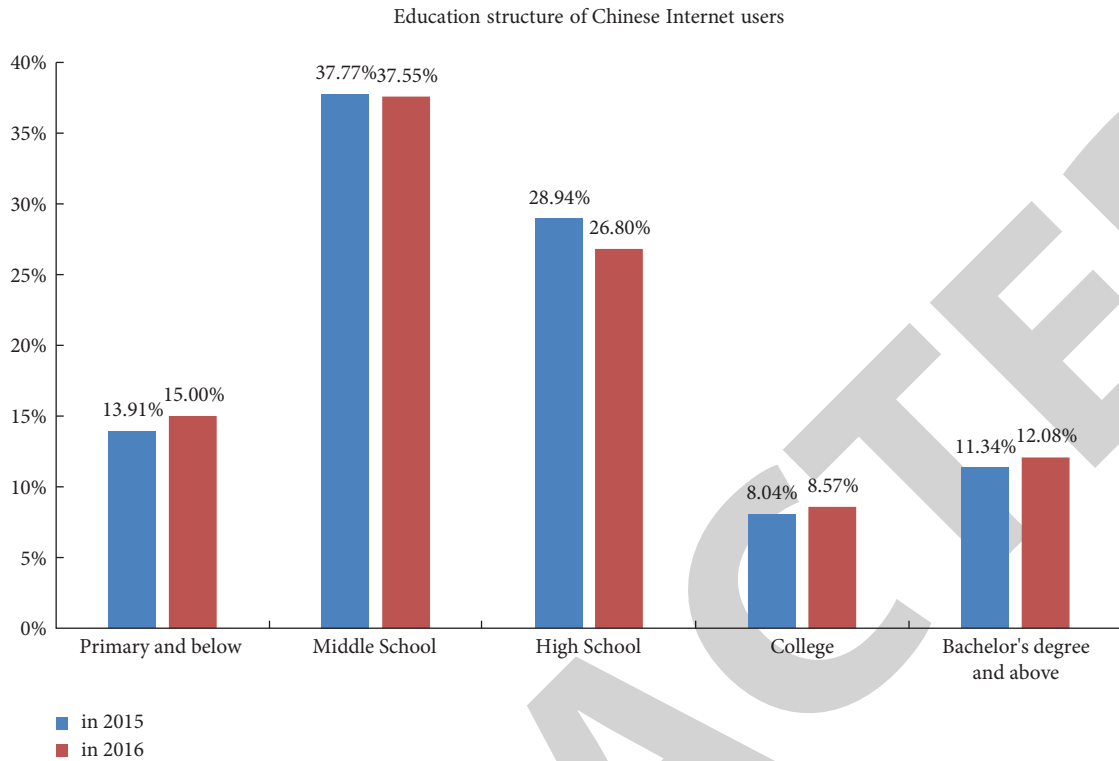
Figure 3: Education structure.

Internet use and shoulder heavier social responsibilities than other groups.

Because of the emergence of the network, college students' learning knowledge is no longer confined to textbooks or the teaching of educators in the classroom. With the Internet as a platform, a variety of rich knowledge and information into the eyes of college students, college students can be 24/7 nonstop learning. People can learn about the world and get information through the Internet anytime and anywhere. According to a survey, most college students believe that the Internet is helpful for their professional learning (see Table 1).

The Internet itself is open, which makes traditional spatial boundaries disappear and makes real-time interaction between people in distant places a real thing. With the increasingly fierce social competition, college students are facing pressure from all aspects. Surfing the Internet is an important part of their choice as a way to relieve stress. In this way, they can expose their feelings to people they know or do not know, vent their emotions, and let the pressure off. Ideological workers can also rely on the Internet to help students solve difficult problems, build up their self-confidence, and prevent tragedies. Through the investigation, it is found that the use of network can have a positive impact on the interpersonal communication mode of college students and also can enrich the form of interpersonal communication and expand the space of interpersonal communication. Table 2 lists the parameters.

The network has brought college students a brand-new experience, which even exceeds the height and depth they cannot reach in the real world, which makes some weak-willed college students addicted to the illusory network world and unable to extricate themselves. According to the survey, almost 80 percent of the respondents tend to rely on the Internet. And students who are obsessed with the Internet are more likely to develop character defects than those who use the Internet properly. Some even reach the level of Internet addiction and live in their own world all the time. Most college students and teenagers have serious Internet addiction. The report data are shown in Table 3. Many college students say that they feel uncomfortable if they do not surf the Internet every day. Table 3 lists the parameters.

3.2. Investigation and Analysis of the Situation of IPE Network Application in Students. "No investigation, no right to speak." Only by actual investigation, we can deeply understand the application effect of network carrier in college students' IPE [19].

College students have the most say on the application and effect of network carrier. This survey selected a domestic university as the key survey object and combined with the network questionnaire "Survey on the Current Situation of the Application of Network Carrier of Ideological and Political Education for College Students." The respondents included junior college students, undergraduates, and some postgraduates, among which male and female accounted for 27.75% and 72.25%, respectively. According to educational background, junior college students accounted for 4%, undergraduate students accounted for 49%, and master's

Age structure of Chinese Internet users
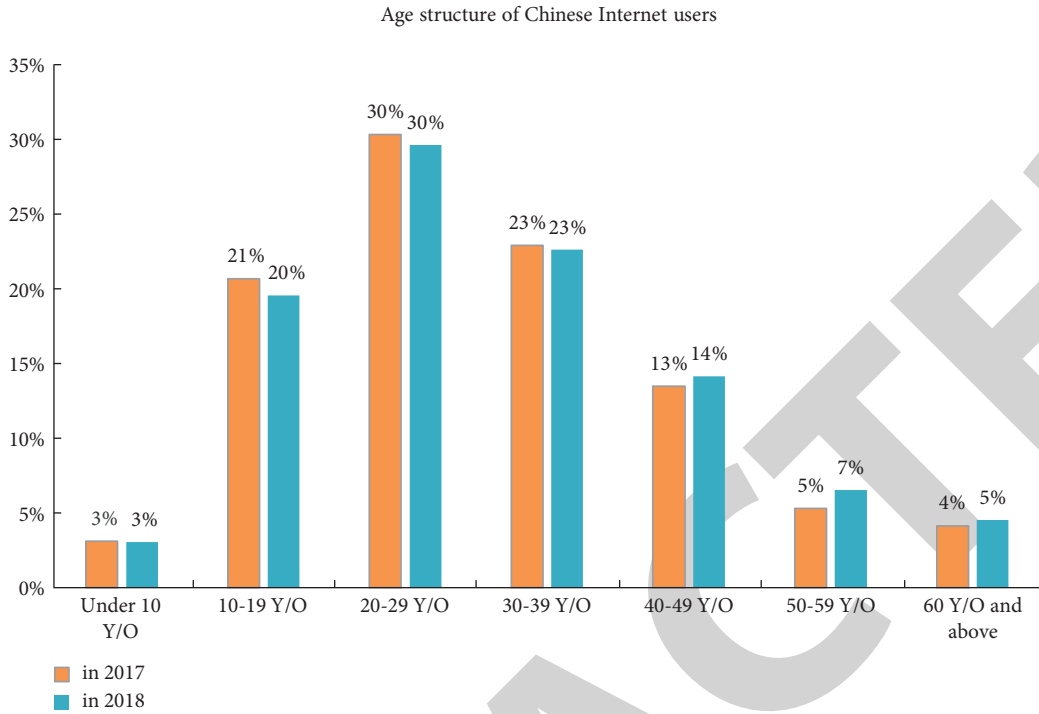
FIGURE 4: Age distribution.

Education structure of Chinese Internet users
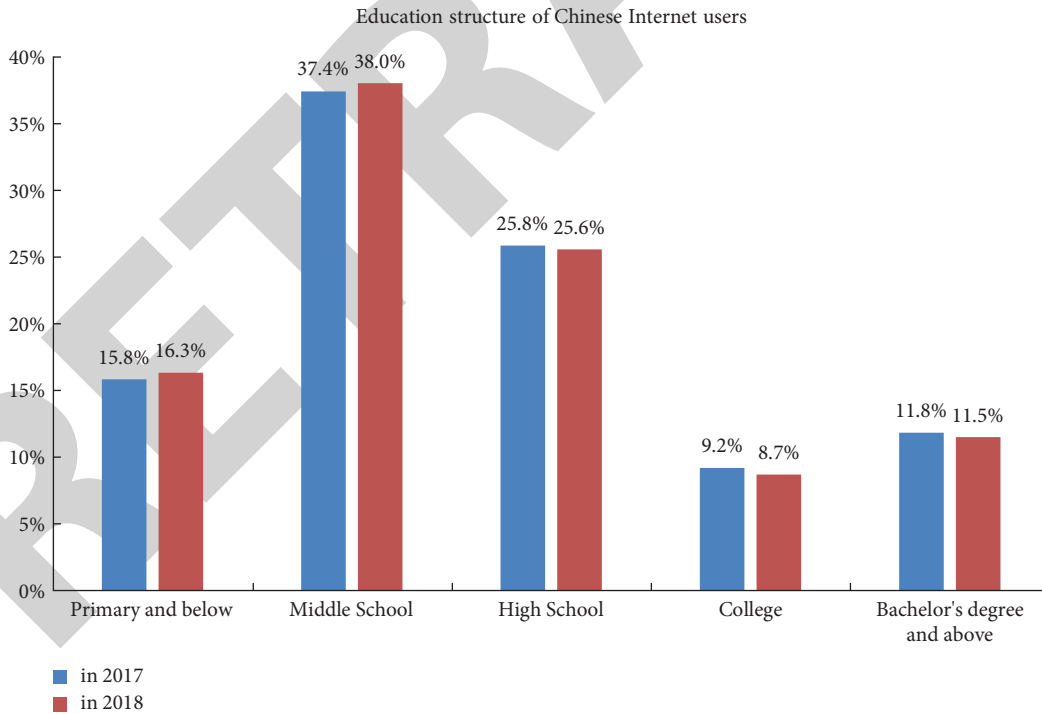
FIGURE 5: Education level.

degree or above accounted for 47%. By major, 35.25 percent of students majored in literature, history, and philosophy, 41 percent in science and engineering, and 23.75 percent in economics, management, art and sports, medicine, and law. The subjects involved in the investigation process cover a relatively complete range of grades and majors. After comprehensive investigation, the obtained data can truly reflect the real problems.

The questionnaire involved 30 topics, including single choice, multiple choice, and question and answer questions,

TABLE 1: The impact of internet.

Added learning materials (%)	Changed the way of learning (%)	Broaden the scope of knowledge (%)	Conducive to professional learning (%)	No impact on study (%)	Interfered with normal study (%)
75.50	38.60	81.70	85.80	11.90	4.20

TABLE 2: The impact of Internet access on college students' interpersonal communication.

Made new friends through the Internet (%)	Keep in touch with netizens (%)	Wants to try online dating (%)	Making friends online affects daily communication (%)	Do not want to make friends through the Internet (%)
61.5	49.5	49.7	38.6	1.1

TABLE 3: Proportion of young netizens agreeing with the view that "if you do not surf the internet for a day, you feel you lack something."

Nonstudents (%)	College student (%)	Primary and secondary school students (%)	Youth Internet users in general (%)	National Internet users (%)
36.5	26.8	21.0	27.1	38.3

covering the development and application of network carrier of IPE for students, their participation, optimization suggestions, and other aspects [20]. It can basically reflect the application status of the network carrier of IPE for college students and help us make further analysis and adjustment.

In the survey, about the question "how do you think the application effect of IPE network carrier?" nearly 90% of the respondents are optimistic about the application effect of IPE network carrier, as shown in Figure 6. 41% think its form is new and more attractive. 16% said it enhanced interaction. Those who think the network carrier is more interesting than the traditional classroom account for 20%. 12.5% thought that the network carrier improved the efficiency of IPE.

First, part of the educators use network carrier proficiency is not high enough. "There is a deep generational gap in the information society, and while children dominate the world's information resources, adults need to work hard and catch up, especially educators." Educators should first understand the network themselves, have enough understanding of the importance of the network carrier and its unique advantages, and learn to use the network to deeply integrate the network and. Most educators have used the network carrier in educational activities, but some educators still do not want to use the network carrier, do not use, are even suspicious of the attitude of the network carrier, and so on. In addition, some educators are not familiar with the operation of network carriers. Regarding this question in the questionnaire, more than 50% of the respondents think that the proficiency level of educators in using network carriers is not high enough, as shown in Figure 7.

The network carrier not only needs to be used, but also needs to be used effectively. It depends on whether the educator can use the network carrier to communicate deeply with the recipient and enhance the interaction. In the survey results, the frequency of communication between teachers and counsellors and college students through online platforms is discussed. As shown in Figure 8, the proportion of those who think little communication is more than 50%,

indicating that the utilization rate of network carrier is not high among educators. Nowadays, almost every college student has a smartphone and a computer, and the Internet goes hand in hand with college students.

Secondly, some college students have insufficient subjectivity in using the network carrier. Only by fully stimulating the subjectivity and creativity of college students in the use of network carrier can the educational effect of network carrier be effectively brought into play. The survey results show that nearly 90% of college students spend more than three hours on the Internet every day, of which more than 60% spend chatting, watching videos, and listening to music. The main channel for them to obtain information is ideological and political theory courses, as shown in Table 4. These data show that college students have not fully accepted the network as the carrier of IPE.

Thirdly, the network carrier content design is not scientific enough. Under the network environment information unblocked channel height, height of resources sharing for educators to integrate education resources rich education content provides favorable conditions, but the network information is complex, spread more disorderly, need educators according to high education purpose design thoughtful, good fun, wide adaptability, can be both informative and thoughtful information repository. Cognitive psychology and communication studies show that, faced with a variety of information, communication objects only select what they think needs to be recognized, and abandon other irrelevant information. For college students, what they need is information with truth, authenticity, value (with the value to meet their personal, social, aesthetic, and other needs), compatibility (in line with their characteristics and needs in different periods), and timeliness.

Educators are more likely to upload teaching plans or learning materials related to theoretical education through the network platform, focusing on theoretical indoctrination. However, psychological education, legal education, and life service are relatively few, accounting for only about 30 percent. The content structure is unbalanced, the format and

The effect of using ideological and political education network carrier
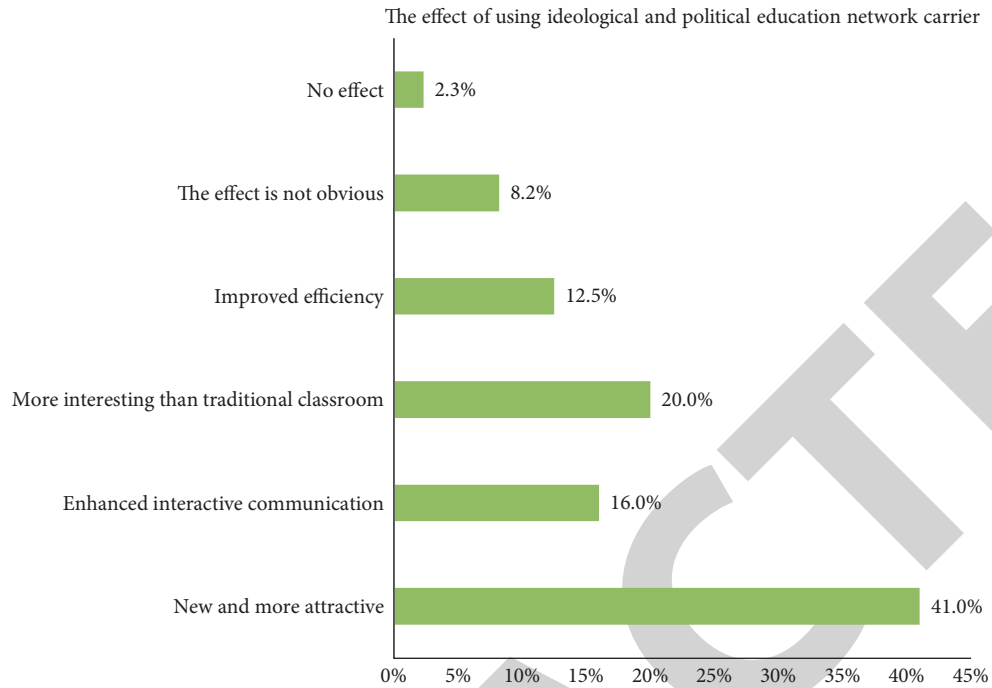
FIGURE 6: Application effect of IPE network carrier.

Teacher's proficiency in using network carriers for ideological and political education
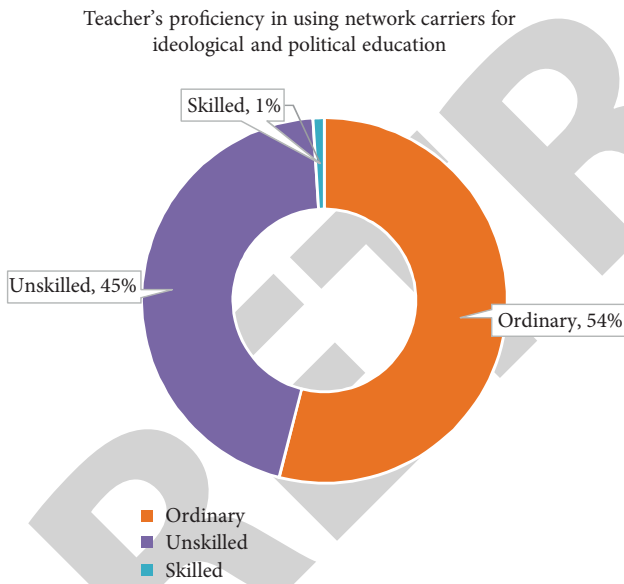
FIGURE 7: Teachers' proficiency in using network carriers.
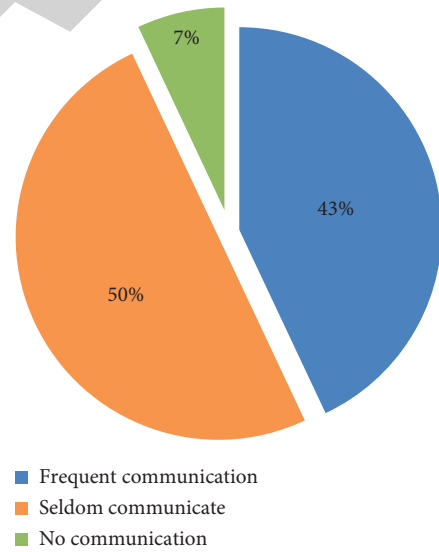
FIGURE 8: Frequency of communication between teachers and counsellors and students through the network platform.

column setting are a little taken for granted, the life, emotion, psychology and other aspects of college students are not enough attention, insufficient guidance, cannot timely and effectively help college students to correctly deal with psychological problems, rational response to emotional fluctuations, and answer the doubts in life. In the survey, more than 70% of the respondents do not often browse the IPE network platform of the school. More than 50% of the respondents just listen to the online class of IPE. The reasons are shown in Figure 9. Among them, 47.12% think the content of network platform is too much political theory,

35.95% are not interested in it, and 22.18% think the update speed is slow. Contemporary college students rely heavily on the Internet and do not like empty, general, and very serious theoretical knowledge. They are more receptive to novel, highly entertaining, and stimulating information. However, the political theory of network carrier content is too strong, which is easy to make college students antipathy.

3.3. Analysis on the Causes of the Existing Problems in the Application of Network in College Students' IPE. As the "fourth media" following newspapers, radio, and television,

Table 4: Main activities of students on the Internet.

Options	Subtotal	Proportion
Internet chat	255	63.75%
Watch videos and listen to music	288	72.00%
Watch news	116	29.00%
Find study materials	208	52.00%
Find information about life (shopping, etc.)	93	23.25%
Browsing posting, forums, knowledge, personal web pages, etc.	90	22.50%
Online games	36	9.00%
The number of people who filled in this questionnaire is valid	400	—

the Internet can integrate the advantages of traditional media with its unique characteristics of massive information, immediacy of communication, and equality of interaction so as to expand the coverage of education and enhance the interest, affinity, and appeal. It has strong circulation interaction function, infiltration guidance function, cohesion and excitation function, and radiation infection function.

Most of the college students are the "post-2000" generation who grow up together with network technology, and their life and behavior are full of obvious digital and network survival logic. In terms of the way of thinking, they are self-conscious, have a broad vision, flexible, easy to accept new things, and pursue individuality and innovation. In terms of cognition, they pursue diversity and yearn for equal interaction and communication in terms of information acquisition. The cognitive approach is no longer satisfied with the traditional didactic approach and has shifted from external authority to internal processing. In terms of value orientation, they tend to be diversified and have strong tolerance to different values.

There are laws and regulations to follow in cyberspace as in the real world. The carrier supervision of campus network is a complex system, which covers the monitoring of carrier content, the research and judgment of sensitive information, the control, disposal and feedback of harmful content, and so on. The supervision of virtual space needs to increase manpower input, but it cannot be completed by manpower alone. In view of the current situation, there are still hard wounds in the supervision of network carriers in colleges and universities. Next, we need to continue to overcome difficulties so as to nip in the back, master the initiative of carrier regulation, and ensure the safety and reliability of network carrier operation.

4. Result Analysis and Discussion

4.1. Highlight the Dominant Content of IPE in Private Colleges under the Network Environment. College students should strengthen their recognition of mainstream ideology. The ideological foundation of "two maintenance" is lay down. Any group needs the right leadership. If there is no head teacher's leadership in a class, there will be no cohesion and unity in the class. In addition, class teachers should also

guide students to comprehensively study various policies. This is the valuable experience our party has gained from practice and a fundamental guarantee for realizing the Chinese Dream. As a new person of the times, we should highly identify, firmly maintain, and consciously obey them.

4.2. Strengthening the Basic Content of IPE in Private Colleges under the Network Environment. What are the contents of ideological literacy education in colleges and universities under the network? First, carry out education in ideals and beliefs. Ideal is like climbing to the top of the mountain, and faith is the power to support the summit. Ideals and beliefs together constitute ideal beliefs. First of all, General Secretary Xi stressed: "We should use new media and technology to make our work come alive, promote the integration of traditional advantages of ideological and political work with information technology, and enhance the sense of the times and appeal." Universities should pay attention to students' dynamics, help students build noble character, and enable them to achieve comprehensive and free development. Then, the content of ideal and belief education should be optimized based on realistic needs. Set up with interesting ideological and political theory content so as to firm up their ideals and beliefs.

Secondly, in the face of diversified cultures on the Internet, it is the only way to educate college students on "three views" in order to prevent negative information from affecting their "three views." First, use a good, healthy culture to take the online ground. Constantly innovate the form of network information dissemination, using the way that college students like to spread ideological and moral theory; use vivid language and typical examples to explain beliefs and integrate boring theoretical content into pictures and animations to improve educational effects. Secondly, the social hot spots of positive energy are used to influence students' "three views." For example, "The Road of Cultural Creation in the Forbidden City" and "Kang Xi feels cute" are popular online searches. Through this social hot spot, students can feel the excellent culture and form the correct "three views" unconsciously.

Good moral cultivation is the guide to adjust various social contradictions. First of all, society, school, and family should unite to strengthen social moral education. On the one hand, schools should incorporate social morality education into the teaching system, teach relevant theoretical knowledge, and organize relevant practical activities. On the other hand, parents should set an example and pay attention to their words and deeds in daily life, such as showing filial piety to the elderly, caring for children, protecting the environment, and so on. Create comfortable, good family environment; lead students to form good moral quality. We should set up the concept of "great political thinking," integrate moral education into other education, expand students' thinking breadth, increase the interest of theoretical knowledge, and stimulate students' learning enthusiasm.

Nowadays, the Internet has become an irreplaceable tool for work and study, bringing new opportunities for

Reasons for not often browsing the ideological and political education network platform
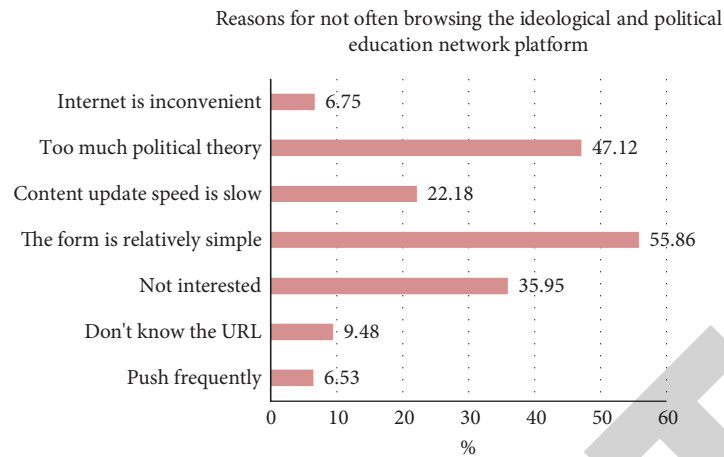
Figure 9: Reasons for infrequent browsing of IPE network platforms.

college students to improve their cultural literacy. However, the culture on the network is uneven, which requires universities to carry out cultural literacy education based on the network and guide college students to learn excellent cultural knowledge.

First, carry out cultural confidence education. Cultivating a new generation of young people with strong cultural confidence is key if a country or nation wants to develop. In today's society, the lack of culture is becoming more and more prominent. Faced with this situation, we must solve the problem from the root. First, cultivate college students' cultural confidence. Universities should set up courses of traditional culture and encourage students to read relevant books so that students can deeply understand the connotation and essence of Chinese traditional culture. Second, we should stimulate cultural confidence and vitality through cultural innovation. In other words, we should attach importance to cultural innovation, which requires colleges and universities to guide students to base themselves on practice, encourage them to participate in social practice activities, broaden their horizons, increase their understanding of real life, and enable them to carry out cultural innovation better.

Second, regarding traditional culture education, Chinese traditional culture, the soul of our nation, contains rich educational resources. As a place to cultivate new people in the socialist era, colleges and universities must strive to improve students' comprehensive cultural accomplishment. First of all, innovate cultural communication channels. Through classroom, practice, network, and other ways to carry out traditional culture education, enrich the channels of education, expand the coverage of cultural edification, and realize the function of excellent culture in shaping the personality of college students. Secondly, promote the new thinking of traditional culture education. Teachers must change their educational thinking, hand over the classroom to students, and stimulate students' learning enthusiasm.

Third, carry out advanced cultural education. First, educate students to be leaders of advanced culture. The openness and concealment of network make college students deviate from the direction of advanced culture. Under the complex and diverse cultural background, whether college students can deeply understand the cultural connotation is related to the future era of our country. Therefore, it is necessary to help college students consciously lead the advanced Chinese culture, to deeply exude admiration and pride of Chinese culture from their hearts, and to firm up the belief of excellent Chinese culture from their hearts. Second, educate students to be the inheritors of excellent culture. Whether human society can develop in a civilized and harmonious way is closely related to the function of excellent traditional culture. For example, after the outbreak of COVID-19, the self-discipline of everyone wearing masks, the dedication of staff to stick to their posts, and the friendship of everyone making donations to Wuhan have all formed a strong spirit of epidemic prevention. Obviously, these spirits are the embodiment of the power of Chinese culture. As a college student, we should cherish the learning platform provided by the school, cherish the precious learning time and resources, strengthen the study of excellent cultural knowledge, improve cultural literacy, and firm cultural confidence.

Finally, students are taught to make full use of various practical activities for cultural innovation. Practice is the source of knowledge and the only way to innovate. Universities should encourage more participation in practice.

4.3. Increase the Charm of IPE Content in the Network Environment. If we can effectively enhance the attractiveness of the content of the network carrier, it will be conducive to effectively play the educational function of the network carrier. We should adhere to the unification of propagating mainstream culture and advocating cultural diversity, take care of the complexity of college students, improve the truth, value, and reality of carrier content, and enhance the persuasiveness of carrier content communication. As mentioned above, college students have formed the consumption habit of short and quick content and pay little attention to and are not interested in the content of the network carrier of colleges and universities, and there is a certain degree of dislocation between the content of the network carrier and the cognitive structure of college

students. For this, we need to organize professional personnel to strengthen team building. We should focus on educating all personnel and promote the building of various specialized teams.

First, it is necessary to set up a leading team, set up a special organization and leadership organization, unite the publicity department and the student work department, make clear the overall goal, overall planning, and work deployment of the network carrier, and ensure the orderly development of daily work. Second, in terms of education courses, class teachers, teachers, students, and college student party members and cadres should work together to select educators with high ideological and political quality, familiar with the characteristics of network language, and able to skillfully use network carriers. They can also choose top students of different grades, different subject backgrounds, and different majors to form a carrier content planning team. I was responsible for investigating the actual situation of college students on campus, understanding the hot topics of college students, and then making and updating carrier content scientifically, and organizing creative activities with the help of network carrier. Third, to organize review and comment team, the whole network monitoring of carrier content can be carried out, and regularly evaluate feedback, timely find problems, and formulate rectification plan. Secondly, we should strengthen the appeal of network carrier content creation. We should adhere to the theory with practice, through the history and reality in the theoretical discussion, really explain the theory thoroughly, get rid of the formal barriers of abstract theoretical study, achieve convincing people with reason, and let the theory into the mind and heart. Therefore, we should attach importance to the combination of historical events, social events, and practical examples around college students to analyze and interpret scientific thoughts.

Young college students have always been concerned about current affairs, we should assist college students to correctly understand the times and deepen the theoretical cognition. In addition, there are a lot of fresh educational resources around college students. Educational celebrities, academic masters, and peer models are key boosters to guide college students to be good. Campus, dormitory, and family are all important sources of carrier content innovation. We should be close to students' lives and incorporate the vivid materials they have personally experienced and experienced into carrier content to carry forward good fashion. While creating their own content, they can also introduce other excellent network cultural works. It not only includes academic planning, career planning, example demonstration, and theoretical education, but also includes social hot spot analysis, cultural inheritance, and warning education to enrich carrier content and realize value guidance.

Finally, the practicability of network carrier content design should be improved because the theme that can attract people and be easy to spread is the basic requirement to grasp the attention of college students. Many college students are "clickbait." They read the headlines before deciding whether to read the content. We should grasp the needs of the times and the general trend of development, dig into various social phenomena, understand the common problems that netizens are concerned about and the individual problems that college students are concerned about. "With a high degree of sensitivity and profound insight, we should distinguish between hot spots and key points, mainstream and tributary, phenomenon and essence, major events and the general trend." Carefully craft eye-catching issues. At the same time, "seize the opportunity, grasp the rhythm, pay attention to strategy, from the timing of efficiency, and reflect the timing of efficiency requirements." In addition to the title, sometimes the quality of the cover can directly affect the click-through rate. Therefore, in the cover design, it is necessary to combine the content style to design the cover size reasonably, choose the right template, tone, illustration, entry, and so on, and form a characteristic mode. To set up the content structure reasonably, highlight the original school. While spreading political theoretical knowledge, class teachers should give college students life guidance and psychological guidance, transmit information directly related to their lives, and arouse their interest and attention. In terms of discourse expression, deep feelings should be integrated, and academic language should be combined with life language. Absorb popular words or newly created vocabulary resources in network discourse, integrate symbols and other forms of expression, and shorten the distance with language and diversified expressions that college students can understand. Illustrate the truth with typical examples that are close to life and instructive.

4.4. Improve the Supervision System of IPE Practice in the Network Environment. We should improve the management rules and regulations of campus network operators. At present, there are loopholes in the management of network carriers. The competent education department should further interpret the spirit of the policy, implement laws and regulations, and conduct extensive research on the operation and management of network carriers in colleges and universities, so as to comprehensively grasp it and formulate universally applicable guiding norms. We can choose good use cases in network carrier management, summarize experience, promote use, and provide effective communication and collaborative development platform for colleges and universities.

Colleges and universities should abide by laws and regulations, implement the instructions of competent authorities, and strengthen the publicity of law. It is necessary to define the level and scope of security management, standardize the procedures for using network carriers, maintenance systems, and emergency measures and procedures for handling online disputes, implement the real-name online system, and supervise and control user registration, login, and information release. In addition, some colleges and universities do not have a very perfect evaluation system; there are some problems, such as disordered evaluation target positioning, one-sided evaluation target, formalization, uncertain evaluation range, chaotic evaluation content, single evaluation method, and failure of

evaluation guidance and incentive function. Therefore, efforts should be made to improve the evaluation mechanism. First, it is necessary to set up scientific evaluation thoughts, fully understand and absorb the latest educational evaluation theoretical achievements, speed up the transformation of evaluation ideas, and correctly understand the guidance, appraisal, incentive, and adjustment functions of evaluation work. Second, it is necessary to establish a three-dimensional and cross evaluation mechanism, and make comprehensive evaluation through education departments, responsible departments of colleges and universities, educators and recipients, and social evaluation institutions.

Second, perfect the campus network carrier supervision department. To build China into a cyber power, the state has set up the Cyberspace Affairs Commission of the CPC Central Committee, and governments at all levels have information cybersecurity supervision departments. To implement effective supervision, colleges and universities also need to set up special supervision departments, such as network carrier construction department, network carrier application information feedback center, quantitative analysis center, and so on. Full-time personnel are responsible for technology research and development, key management, permission setting, information release, risk assessment, and troubleshooting. Build campus network defense system on the basis of the popularization of campus network, maintain the system regularly, audit the content in the network carrier, and filter spam and illegal information, harassment information, and virus links. The high standard of network supervision for technology needs the support of high-level network security talents. Therefore, colleges and universities need to improve talent training specifications, optimize talent introduction policies, set up relevant specialties and research institutions, hold relevant training, and fill the talent gap.

Third, strengthen students' sense of self-discipline and enhance their ability of independent supervision. China had 989 million Internet users in 2020, and college students are a more active part of the nearly one billion Internet users. In the campus network carrier supervision, the main body of college students also plays an immeasurable role. Colleges and universities should strive to create a legalized and civilized campus environment, strengthen the publicity of law popularization and cultivation of network morality through classes, lectures, forums, knowledge competitions, campus banners, micro films, and other ways, and guide students to enhance network self-discipline and establish correct network cognition. College students should also consciously improve the network ideological and moral cultivation, self-examination and self-correction, and self-restraint. Think deeply and independently before speaking, and avoid stereotypes. Do not make assumptions about hot issues. Do not engage in personal attacks when sharing ideas. To the emergency to investigate the truth, do not forward comments at will, the formation of false induction. Strengthen the awareness of network security, establish the concept of network law, consciously abide by laws and regulations, to achieve online self-discipline, self-examination, and self-protection. Be alert to audio, video, and written remarks containing extremism, separatism, and terrorism on the Internet; report them immediately and stop watching them once found. Do not comment, do not discuss, do not take the initiative to download and save relevant materials, do not forward and spread, and improve sensitivity and insight. In addition, the school can try to establish a student volunteer team, can also allocate some funds for students to work and study, and participate in the monitoring and maintenance of the campus network carrier. Students can also be regularly organized to conduct a questionnaire survey or interview, self-evaluation, reflection on their own thoughts, cognition and behavior, and combined with praise, reward, and other ways to encourage students to self-monitoring. We should also attach importance to all kinds of student organization resources, and they should take the lead in organizing propaganda and education activities and mobilizing college students to participate in network supervision. In a word, college students should play the main role, pay close attention to the network information, monitor the content of the network carrier, enhance the awareness of prevention, improve the screening ability, and timely find, report, and deal with bad information. To improve the rules and regulations, manage kinds of processes and other valuable suggestions.

5. Conclusion

In the era of "Internet + education," the Internet has become the main way for private college students to directly obtain information. Private colleges and universities should only build a "network ideological and political" pattern under the unified leadership of the party committee, and build a main force of network ideological and political construction with excellent ability and quality. Therefore, this paper firstly elaborates the concept of PCU, introduces the current situation of IPE of students in PCU in China under the network environment, and studies the corresponding countermeasures and the paths of subsequent practice through the research and analysis of existing problems. There is still a lot of space for the research on IPE of college students in the network environment, and in the future, the author will conduct deeper research on the IPE of students in PCU in China in the network environment. On the basis of the original research, further attempts will be made to find a new construction path.

Data Availability

The labeled dataset used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this paper.

Acknowledgments

Retraction

Retracted: An Exploration of the Environment, Composition, and Transmission of the Development of Local Theater and Music in the Natural Environment and Folklore Activities of Tea Picking

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] N. Zhang, "An Exploration of the Environment, Composition, and Transmission of the Development of Local Theater and Music in the Natural Environment and Folklore Activities of Tea Picking," *Journal of Environmental and Public Health*, vol. 2022, Article ID 9491745, 10 pages, 2022.

Hindawi

Research Article

An Exploration of the Environment, Composition, and Transmission of the Development of Local Theater and Music in the Natural Environment and Folklore Activities of Tea Picking

Na Zhang ⓘ

School of Music and Dance, Yichun University, Yichun 336000, Jiangxi, China

Correspondence should be addressed to Na Zhang; 112014@jxycu.edu.cn

The spread and urbanization of modern culture have led to a crisis in the development and inheritance of traditional culture, coupled with the limitations of traditional drama itself, and local opera has gradually disappeared from the daily life of the local people. Through the analysis of the tea opera cases and the development environment and inheritance of local operas, the paper tries to solve the inheritance dilemma it faces and provides a new perspective and demonstration for the development and inheritance research of Bobai Jinan tea Opera, which is of great significance to the development and propaganda of traditional Chinese culture.

1. Introduction

The tea opera is a theatrical presentation of the national culture of tea picking in the mountains; through the performance of the actors, the audience is put into the tea-picking activity, projecting the natural environment of tea picking and deriving the psychology of memorialising and caring for the natural environment of the tea mountains.

Opera, as the name suggests, is a form of drama that combines poetry, music, dance, and other arts. As a local art generated by the history of a specific region, the inheritance and development of local opera are inseparable from the cultural ecology of the specific region that nurtured its growth. Local opera originated from the regional customs in the farming society, and it has developed and matured in the practice of public life and then has a complete script and performance program [1]. The reform and opening up that started in the 1980s pushed Chinese society into a rapid modernization process. Modern civilization has changed people's daily life with incomparable penetrability, leading to the decline of traditional culture and local opera art. Particularly due to the fact that "the market economy has changed the traditional cultural ecology, the spread of

modern culture has led to a crisis of traditional cultural identity, and urbanization has accelerated the disintegration of the original cultural space" coupled with the limitations of traditional drama itself, the popular regions, and performances of local dramas all over the country [2]. They have been greatly reduced, and local operas have gradually faded out of the daily life of the local people. Many local operas have disappeared from the daily life of the public and become unreproducible historical memories [3]. Many local operas are in an endangered state and have almost fallen into an irreversible overall inheritance crisis [4]. The art of opera was very popular in the early twentieth century, such as Peking Opera, Kunqu Opera, and some local operas (Qin Opera, Cantonese Opera, Jin Opera, Henan Opera, and Yue Opera) [5].

After the founding of New China, the development of local opera was unprecedentedly prosperous, and some small operas were also born. Nowadays, Chinese opera has entered a stage of slow development, in which there are objective external and developmental factors, including the market occupation of the new culture, and the content of this paper is too outdated, but the author believes that it is necessary to find problems from oneself and to dig deep into

the cultural value of local opera because cultural things will be in any era [6]. There is market demand, and the presentation of culture is the key issue. According to data research, the ways that people understand traditional culture mainly include several ways shown in Figure 1. Faced with the development of local operas today, we must first look at how much we have inherited or whether it is that "flavor;" secondly, we should think about how to develop and whether we have found a way for the development of this type of opera because each type of opera has certain differences [7]. There are both commonalities and differences in the problems of the local opera, so a specific analysis should be carried out according to the problems of the local opera [8]. Chinese opera art is composed of many local operas such as Peking Opera and Kunqu Opera. There are 348 local operas in existence [9]. Local opera is another manifestation of regional culture and local ethnic culture. Sex has become the cultural characteristic of local opera. In the era of rapid development, the pace of development of the art of opera has become slow. This does not mean that the art of opera is outdated, nor is it that the audience does not like opera, but to find problems fundamentally, inherit and retain classic and excellent content, and realize development with the times [10]. This paper puts forward the author's research on the inheritance and development of local opera in recent years and uses examples to illustrate the effective measures that can be taken for the protection, inheritance, and development of folk art [11].

Local opera is a local art bred by the local culture of a certain region during the farming society and has been inherited and developed in the survival practice of its creators. After entering the modern society, with the gradual disintegration of the local field on which survival depends, local opera has fallen into an increasingly serious crisis of inheritance. Through the practical logic analysis of the environment, composition, and inheritance of local opera and music development, it tries to solve the inheritance dilemma it faces and supplements new perspectives and interpretation paradigms for the inheritance research of local opera.

Drama originated from folk sacrifices in ancient times. As early as the pre-Qin period, there were witch songs and dances that entertained both gods and people [12]. It lasted for thousands of years and formed local dramas with dialects, local customs, and national characteristics as important features. Since the reform and opening up, the party and the government have invested a lot of money and strength in the prosperity and development of local opera art, and local governments have also introduced some relevant protection measures so that local opera and national art have a new look after the "Cultural Revolution." However, with the rapid development of society and the influx of Western culture, local operas with dialect as an important feature have encountered different degrees of crisis in the market competition. According to China Culture News, on May 12, 2011, there were 16 Beijing and Kunqu Opera troupes that retained the nature of public institutions, and there used to be more than 300 kinds of local operas, but now only 13 have survived, which is obviously too few [13]. When Chairman Mao Zedong formulated the eight-character policy for the

party's opera work, he wrote "let a hundred flowers bloom" before "introduce the old and bring forth the new," which can be understood as a special emphasis on protecting the diversity of ethnic folk opera and encouraging them to achieve common prosperity through innovation and free competition. Only when Peking Opera, Kunqu Opera, and other local operas can be protected and have the opportunity to survive and develop is the true blooming of Chinese opera. Shaanxi is one of the regions with a wide variety of local operas in China. In addition to the widely popular Qin Opera, Meihu, Wanwan Opera, Shangluo Huagu, and other major operas, there are also very original ones, including Tongzhou Bangzi and Huayin Lao Opera. There are authentic Shaanxi local small operas such as Fuping A Palace Opera, Chondboard Opera, Han Diao Erhuang, Huaxian Shadow Play, Heyang Line Opera, Xinchi Dance Opera, Storytelling in Northern Shaanxi, and Xi'an Drum Music. In the late 1980s, Shaanxi local opera was under the impact of modern and powerful cultures such as film and television and pop music. There are nearly 30 local operas in the province; only Qin Opera, Meihu, Wanwan Opera, Shangluo Huagu, Jin Opera, and other operas have long-term performances; with the disintegration or dissolution of troupes in other places, the operas are almost on the verge of extinction. The only performances are only fragmented performances and opera solo performances by actors in groups of three or five during festivals, weddings and festivals, temple fairs, and sacrifices. Since the beginning of the twenty-first century, with the launch of the national intangible cultural heritage protection project, a number of local operas such as Qin Opera, Han Diaojie, and Heyang Dance Opera have been included in the national and Shaanxi provincial intangible cultural heritage protection lists [14], as shown in Table 1.

With the national and provincial intangible cultural protection efforts and investment funds increasing and increasing year by year, local opera, which was almost dead, has gradually survived and has developed to a certain extent. Especially in recent years, Shaanxi's economy has entered the fast lane of rapid development, and local operas have also appeared vigorously along with the economic development [15].

High-level stage artworks and performances have also moved from the original performances of Chinese New Year and festivals, worship of gods, weddings, funerals, and marriages to mainstream performances in the city. For example, the Zhidan County Song and Dance Troupe, established in 2007, has successively launched a series of themes such as "Ode to the Red City," "Love in the Red City," "Hanging the Red Light," and "Orchid Flower" with the strong support of the county party committee and the county government. Outstanding stage artworks with bright, broad themes, diverse styles, and strong artistic appeal. In particular, the large-scale Xintianyou song and dance drama "Hanging the Red Light" and "Orchid Flower" in northern Shaanxi achieved great success in Zhidan, Yan'an, Xi'an, Nanjing, and Beijing and won unanimous praise from national, provincial, and municipal leaders and all sectors of society. "Hanging the Red Lantern" participated in the

Figure 1: Ways that people understand the traditional culture.

Table 1: The national intangible cultural heritage project.

Traditional handicraft skills	Herbal tea making skills, 2006 Oolong tea making skills (Wuyi rock tea making skills, 2006; Tieguanyin making skills, 2008) Black tea making skills (Qimen black tea making skills, 2011) Green tea making skills (West Lake Longjing, Aoyuan Juyan, Gongshan Maofeng, Taiping Houkui, and Lu'an Guapian, 2008; making skills of Biluochun, Anji white tea, and purple bamboo shoot tea, 2011) White tea making skills (Fuding white tea making skills, 2011) Pu'er tea making skills (Gong tea and Dayi tea making skills, 2008) Black tea making skills (making skills of Qianliang tea, Fuzhuan tea, and Nanlubian tea, 2008; making skills of Xiaguantuo tea, 2011) Flower tea making skills (Zhang Yiyuan and Jasmine tea making skills, 2008; Wu Yutai and Jasmine tea making skills, 2011) Refreshment making skills (Fuchun, 2008)
Social customs, etiquette, and festivals	Tea art project: Chaozhou Gongfu tea art, 2008; temple fair project: Gancha farm in Pan'an County, Zhejiang Province, 2008; Jingshan tea banquet, 2011 in Hangzhou, Zhejiang Province Chashan Haozi, Chenxi County, Hunan Province, 2008
Performing arts	Gannan Tea-Picking Opera, Guinan Tea-Picking Opera, and Yangxin Tea-Picking Opera, 2006; Gao'an Tea-Picking Opera, Fuzhou Tea-Picking Opera, and northern Guangdong Tea-Picking Opera, 2011

"China International Youth Art Week," the 5th Shaanxi Provincial Arts Festival, and the 1st Shaanxi Provincial Farmers' Art Festival, which was a large-scale cultural event to welcome the Olympics. The Shaanxi Provincial Arts Festival Organization Award, Repertoire Award, Screenwriter Award, Director Award, Outstanding Performance Award, Outstanding Stage Design Award, Lighting Award, and Costume Award. After the successful performance of "Orchid Flower" in China, the province, the city, and the county, it participated in the 6th Shaanxi Arts Festival in October this year and won the Outstanding Play Award, Outstanding Performance Award, and Outstanding Stage Design Award. The dance "The Man in Northern Shaanxi" won the second prize in the 9th National Dance Competition. The sketch "The Fragrance of Fruit Flowers" won the Outstanding Performance Award in the 2nd Shaanxi Provincial Small Opera Sketch Competition in 2008 and the Outstanding Play Award and Director Award in the First

Shaanxi Provincial Farmers Art Festival. "Hongdu Group" won the second prize in the 2nd Shaanxi Provincial Folk Song Competition in Northern Shaanxi Province and the first prize in the Yan'an City Shaanbei Folk Song Competition. Secondly, Zhidan County Song and Dance Troupe can dedicate a party to cadres, workers, and urban residents every month and truly become a mainstream performance group in the city. Jia Pingwa, a famous writer from Shaanxi, loves Qin Opera. In his prose "Qin Opera," written in the 1980s, he described the love of Shaanxi people for Qin Opera, especially the obsession of rural people with Qin Opera, the simple and honest farmers. The image is vivid and vivid, Qin Feng and Qin Yun are so natural and harmonious, the Huangtian Houtu of the eight hundred miles of Qinchuan interprets the joys, sorrows, and joys of the Qin people, and the Qin Opera is their stage, in a hearty mood. However, there is really not much that has been passed down now. As far as Zhidan County People's Troupe is concerned,

it was established in December 1951 and has been popular for more than 50 years. It has passed down generations to cultivate national-level actors and provincial-level excellent plays. For example, "Dou E's Injustice," "Three Drops of Blood," "Golden Hairpin," "Civefish for the Prince," "The Case of Gu Mei," "The Red Account," "Wangjiawan People," and so on are provincial award-winning plays. Now it has disappeared. The troupe was also forced to disband in 2007.

The "2018 Douyin Big Data Report" (hereinafter referred to as the "Report") shows that Huangmei Opera in Anhui has become the most popular local opera, while Henan Henan Opera, Shaanxi Qin Opera, Hunan Huagu Opera, and Zhejiang Kunqu Opera are widely spread on Douyin, occupying the top five local operas (shown in Figure 2).

In the past two years, with the continuous popularity of short videos, there are also local dramas that have opened up new online spaces. Take Taikang Taoist drama as an example. It is understood that the troupe currently has 27 Douyin accounts, 12 Kuaishou accounts, and 18 Volcano small video accounts. The video content is rehearsed and performed daily. For example, the troupe's actress Yanling Li, a Yu opera singer who is active in the field of short videos, the three short video accounts have released a total of 2,372 videos, with more than 150,000 fans and nearly 400,000 likes. In addition, there are 6 actors with more than 10,000 fans, and other actors also have different numbers of fans, forming the influence of Taikang Taoist drama on the Internet. Taking the volcano video as an example, the statistics are as follows, as shown in Table 2.

2. Traditional Local Opera

2.1. The Local Character. Most of the local operas in our country were produced and developed in the farming society, and the interweaving of agricultural economy and rural humanities created the locality of local operas in terms of content, subject matter, theme, and style. Therefore, the themes of local opera performances are close to the daily life of the local people, and the life stories of talented and beautiful women, elders and children, benevolent filial piety, and heroes are used to promote the moral norms of punishing evil and promoting good in civil society. The plot is simple, the theme is clear, it is easy to understand, and it is mainly based on comedy, which combines reasoning with music, brings people the joy and teaching of gentle wind and drizzle, and is deeply loved by the local people [16].

The important thing is that the local life rooted in local opera is the life model of rural villagers, and the folk art it nurtures is not affected by the strict standardization of mainstream culture, thus achieving the simple and beautiful local characteristics and free and flexible artistic style of local opera. Therefore, local opera has a strong taste of local culture, expresses the lifestyle of rural people, and interprets their simple thoughts and emotions with tunes that are consistent with the regional customs. It is a typical "grassroots" art. For example, Kunqu Opera retains the folk art characteristics of Southern Opera, and the performance is not restricted, free and lively, and strong in randomness. Cantonese Opera and Niu Niang Opera in Guangdong and

Guangxi are both known for their "exploding belly," and "the play is in the belly, and it is improvised to sing"; that is, the actors improvise according to the theme of the play, with a greater degree of freedom. The plot of the local drama is simple, and the performance sets, props, and soundtracks are relatively simple. Three or five actors can hang a curtain on the spot to act, which is very suitable for the simple aesthetic and entertainment needs of farmers. In terms of expression, the dialects and accents used in local operas have a strong local flavor, the lyrics and dialogues are colloquial, and the vocals are clear and lively. The tone used in any local opera is consistent with the dialect, and generally, it can only be sung in its regional dialect, reflecting the musical beauty of this dialect. It can be seen that the generation, development, and derivation of local opera all depend on the long-term infiltration of regional culture, and the performance program close to the life of farmers interprets the life world of farmers and enriches the daily life of farmers. Therefore, local opera has a strong local character and is the folk culture with the most local complex in the local society. Because local opera has strong local characteristics, mixed with various folk cultures, its forms and content are diverse, so local opera is also a more complex folk culture.

2.2. The Life Logic of Inheritance. If the "grassroots" artistic characteristics of local opera are formed in the strong local culture, then its orderly inheritance and development between generations depend on the human habitat nurtured by local culture; that is, the traditional farming society has constructed the ideal inheritance field of local opera. During the period of traditional Chinese society, not only did more than three-quarters of the population live in the countryside, but also our cities were "big villages with walls and yamen authorities." In the vast villages, especially in remote areas, the transportation is inconvenient, the villagers are confined to the closed and small villages to cultivate the land, and life is monotonous. Entertainment, festivals, and sacrifices through opera have become their most convenient and interesting folk activities. In view of the backwardness of the natural economy, the single way of livelihood and the output of farming is not enough to support the family; some people even use singing as a sideline or main means of livelihood to support their families. In addition, the village is a living space based on blood relationships. The villagers live in this "society without strangers," and they need and are keen to use sound operas to interpret rare legendary stories in daily life. In this way, local opera is deeply rooted in the life of the villagers. Almost every village has a stage. The villagers entertain themselves by "singing opera" during the slack time of farming and during the festivals. For birthdays, weddings, funerals, weddings, and other happy events, every household will invite the troupe to perform a play to celebrate, and singing has become a daily life in rural society. Under this "life-oriented" mechanism, the local people in the popular areas of each local opera can sing and enjoy it, and local opera can be passed down from generation to generation through this "group entertainment practice."
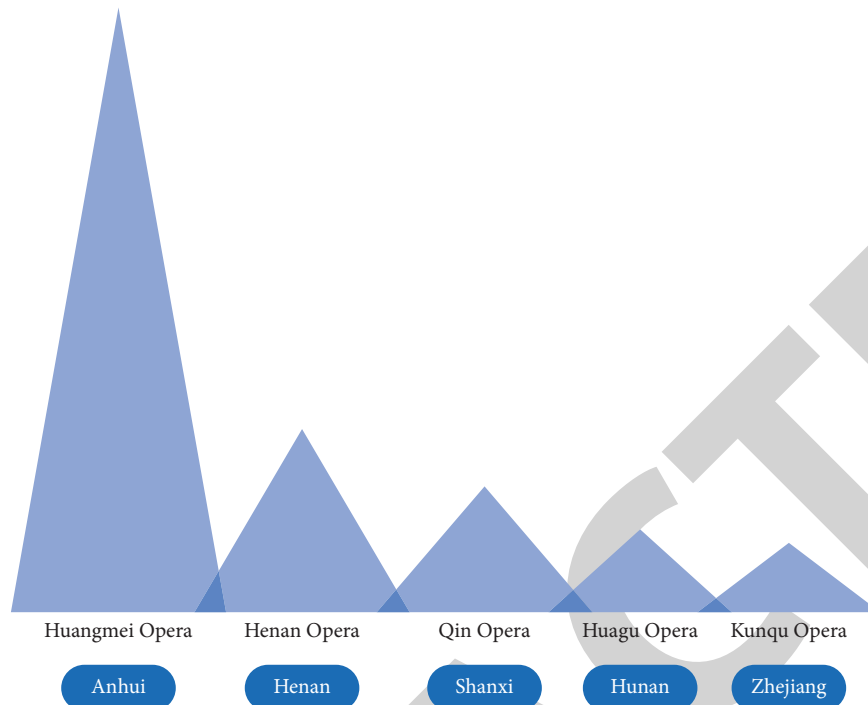
FIGURE 2: The top five most popular local dramas on Douyin.

TABLE 2: The influence of a certain local drama on the volcano video.

No.	Volcano nickname	Total number of fans	Firepower	Total number of live broadcasts	Total number of works
1	Taikang Daoqing Li Yanling	2.5 w	4.5 w	68	164
2	Taikang Daoqing Li Yanling	6.5 w	3.4 w	13	1637
3	Taikang Daoqing Art Conservation and Inheritance Center	2094	102	0	24
4	Taikang Daoqing Liu Fanxia	3844	7703	13	919
5	Taikang Taoism Liu Fanxia	2.0 w	4444	27	137
6	Taikang Daoqing Luo Ali	7672	9345	9	332
7	Sun Xiangang	905	2538	25	649
8	Liu Xiuwu	37	7	0	3
9	Zong Xiankun	62	337	0	58
10	Huibao	1.3 w	1.7 w	81	412
11	Dodo	4.2 w	3.8 w	118	1707
12	Zhang Xiaoyu	1.6 w	2.3 w	9	410
13	Bright	1.3 w	1.7 w	66	1837
14	Daoqing Xiaojun	4549	1.2 w	62	1140
15	Taikang Daoqing Zhang Lei	2263	5563	28	787
16	Zhang Feng	112	271	0	92
17	Taikang Daoqing Pear Orchard Chun Lei Luo Aihua	117	380	2	106
18	Hou Zhenzhen	2.2 w	3.0 w	64	150

In the period when local operas were popular, the troupes of local operas spread almost all over the villages. Every time the troupe performs a play, they can get a spontaneous donation from the audience or the bride price of the inviting party. In order to win more performances and good social prestige, each troupe pays attention to its own development. On the one hand, they organize actors to write scripts and strive to diversify the content of performances. On the other hand, they attract artists with superb acting skills to join the troupe, strengthening internal training and improving acting skills. Every artist wants to enter a troupe with a good reputation in order to gain both fame and fortune in terms of economic income and social reputation. They choose a good opera troupe as much as possible and rely on it as an organization for learning and development. There are various ways for actors to learn art. It is the most common and convenient for actors to learn art from apprentices within the troupe, followed by "scoop learning"

from peers, and then to improve their acting skills with the help of performance opportunities. Some actors get close to the troupe leader to get all the resources that are beneficial to their own performance development and use this to grow into the "stage pillar" of the troupe, while some actors who grow into the "stage pillar" have set up another troupe to become the troupe leader, seeking personal development of the performing arts career. In this way, the troupe and the actors are interdependent, and they take all the action strategies that are beneficial to their own development and jointly promote the link between the two-the inheritance and the development of local opera. In traditional society, although actors are discriminated against, they are subject to general social and economic poverty. Acting can become a means of earning a living for some lower-class people and even a rare opportunity to be promoted to the upper class of society. Therefore, many children from peasant families have been attracted to opera troupes since childhood. They studied with a teacher and loved their acting career all their life. During the investigation in Guangxi, a provincial inheritor of local opera who was nearly seventy years old told the author that there were 13 friends in the same village who joined the opera troupe with him to learn opera. Acting is a means of earning a living for troupes and actors, and it reflects the "survival" nature of human beings. Under the "survival" mandatory mechanism, local opera has been effectively inherited with the "master-apprentice + performance" model. In cities, the inheritance of local opera mainly depends on various artists and art schools, which attract inheritors to follow them through their own fame.

Field theory holds that the existence of any kind of social space will inevitably generate its habitus so as to ensure the stability and persistence of the field and to discipline the practical subjects in the field. Habitus, once formed, "can generate an infinite, relatively unpredictable, but limited variety of practices" and "ensure the effective existence of prior experience. They have the same characteristics over time." The continuous existence of the traditional social field and the local field not only reflects the construction of habits but also promotes the lasting role of habits, and the local opera and other folk cultures have developed under the construction of this traditional habit. Therefore, in the traditional field, local opera has always been the choice of local people's pastime and some farmers to make a living. With the practical logic of "living" and "survival," it enriches the daily life of the public and achieves its own art.

3. Inheritance and Retention of Local Opera

3.1. The Inheritance of the Classic Works.
Classical works represent the main charm and cultural meaning of local opera, and the inheritance of classic works is the protection of this culture. On May 20, 2006, Guinan Tea-Picking Opera was approved by the State Council of the People's Republic of China to be included in the first batch of national intangible cultural heritage lists. But the drama cannot be a museum art with only text, photos, and video materials. The written record is limited, the photographic record is one-sided, and the image data can have a relatively complete record. But images are "dead" after all, opera is the art of "corner," and it is the right way to inherit from people. The first problem of inheritance is to retain the most original things of the classic repertoire. Only these orthodox things can have the premise of innovation and development. In the history of development, Guinan Tea-Picking Opera has also continuously integrated other elements of "tea-picking opera" to form what it is today and has also formed a set of program system and performance characteristics that belong to Guinan Tea-Picking Opera and created mature classic works, as shown in Figure 3. It is the imprint of the times in the development of Guinan Tea-Picking Opera, these imprints also need to be preserved as they are, and people (performers) must be preserved together with the video materials [14]. There is a special way of inheritance of opera, which is "oral and heart teaching." The artistic characteristics of opera "jiao'er" also depend on people. The biggest factor for a classic play to become a classic is the performer's personal skills and the charm of performance style.

3.2. Music Features.
Guinan selected tea opera, as one of the local classic operas, has many musical style similarities with other "selected tea operas." "Witty" and "fun" are the two characteristics of the music of Guinan Tea-Picking Opera. First of all, Guinan Tea-Picking Opera and other tea-picking operas are products derived from life. Its melody often appears in tea-picking labor scenes, and this melody has become a way for people to soothe their emotions and regulate fatigue. Most of the stories told in Nancai Tea Opera focus on the trivial life of the common people. The melody of the music is funny and humorous, which brings people a sense of physical and mental pleasure, and gradually becomes an "entertainment necessity" after work and in life [17]. The music development of Guinan Tea-Picking Opera started with the integration of folk minor tunes. The development process had three stages. The first stage only sang folk minor tunes, the second stage integrated a variety of tea-picking melodies for joint singing, and the third stage developed some folk dance music, which gradually formed the current music system. These include "tea-picking lanterns" such as "watching tea tunes" and "picking tea songs." In the music melody of Guinan Tea-Picking Opera, there is a melody of "Yuduya" as a lining, which has a unique flavor, and the audience is deeply affectionate and widely sung. Therefore, "Yuduya" has become another common name for Guinan Tea-Picking Opera. Because the Guinan Tea-Picking Opera has a unique performance style that emphasizes both singing and dancing, the singing atmosphere is very lively and enthusiastic in the scenes of multiperson performances, and the singing and dancing scenes are more flexible and eclectic. The free expression style and the melody of "Yu Du Ya" with different emotions make the characters more distinct and their emotions more accurate. The musical features of Guinan Tea-Picking Opera "Yu Du Ya" have become the unique musical elements of the opera, which greatly enhanced the artistic charm of the opera. In the inheritance of the music of the tea-picking opera in southern
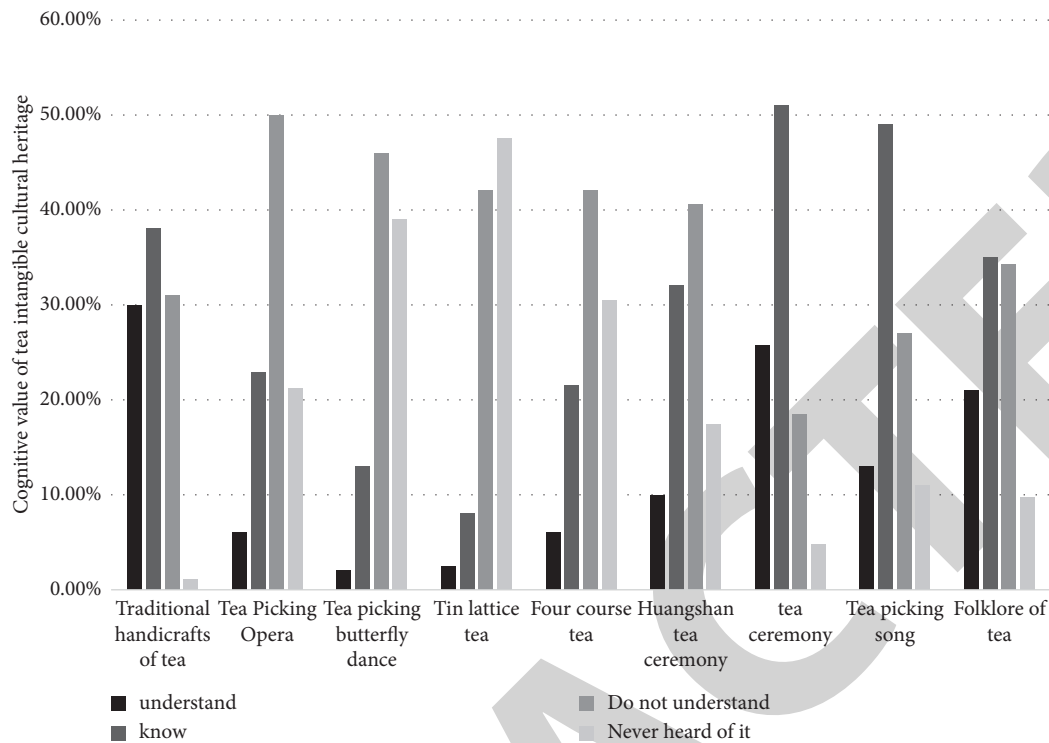
FIGURE 3: Choose the classic elements from the tea play.

Guinan, these original, witty, and interesting musical elements should be kept intact for a long time.

Opera in different places have different characteristics. Table 3 lists the characteristics of 10 kinds of opera, including Yue Opera, Peking Opera, and Kunqu Opera.

3.3. Belt Inheritance. Belt inheritance is to drive the people around them to participate in the inheritance of traditional culture. The greatest charm of the art of opera is the people because different actors in the same play will show different artistic characteristics (tastes), in terms of both singing and performance. That is where the saying "acting is a play, watching is a human being." A former opera artist would perform dozens of plays and many hundreds of plays, and the plays they performed have formed their own set of systems. Practice has almost merged tricks with people. This is his understanding of the work, and he has shown his understanding with the skills he is good at, which has been passed down to this day. Now there are fewer and fewer old artists in the tea-picking opera in southern Guinan, which has sent a signal that the number of local operas in China is decreasing year by year, and it is also because of the departure of old local opera artists [18]. The "Several Policies on Supporting the Inheritance and Development of Traditional Opera" implements the "Famous Traditional Opera-Famous Opera Masters Accept Apprentices to Pass on the Arts" plan and supports all types of opera art performance groups, schools, and research institutions at all levels to adopt "One Belt One, One Belt Two" and other methods, teach the essence of opera performance art, and establish a "two-way communication" mechanism between young teachers of opera colleges and young backbones of opera art performance groups to create good conditions for cultivating a new generation of young top-notch talents. Through the investigation of cultural inheritance in the four regions, it is found that the success rate of cultural inheritance in the four regions is more than 30%, as shown in Figure 4.

Although the development history of Guinan Tea-Picking Opera is not as long as Kunqu Opera, Qin Opera, Cantonese Opera, Liyuan Opera, and so on, it is also an inseparable part of the "tea-picking opera system" in Guangxi and even the whole country. As the representative of "Hakka Tea-Picking Opera," it should be more important to pay attention to its inheritance; otherwise, the cultural loss of Guinan Tea-Picking Opera will be faster [19].

A representative work of the local opera is listed in Table 4.

4. The Development of Local Opera

4.1. Create New Products and Promote Development. With the continuous improvement of social development and people's living standards, people's requirements for entertainment projects are also increasing. As a local opera with a profound cultural heritage, there is still a lot of room for market development. Bobai Guinan Tea-Picking Opera (Bobai Folk Art Conservation, Inheritance and Development Center, Tea-picking Department), as one of the few literary and art groups in the country that studies and develops Guinan Tea-Picking Opera, shoulders the important responsibility for the development of Guinan Tea-Picking Opera. It is not easy to create works that can promote the development of dramas, and it is even more difficult to make

TABLE 3: Features of ten local operas.

Species	Characteristics	Main regions
Yue Opera	Lyric, with a clear and graceful voice, beautiful and beautiful, and the performance is real and moving, with a strong Jiangnan local color	Zhejiang, Shanghai, Jiangsu, Jiangxi, Anhui, and Fujian
Henan Opera	The voice may be high and lively or sad and lingering	The vast northern areas of the Yellow River and Huai River Basin
Pingju	The articulation is clear, the singing is clear, and the performance is full of life, lively, and free	Beijing, Tianjin, Hebei, and the three northeastern provinces
Kunqu Opera	Strong lyricism and delicate movements	Jiangsu, Shanghai, Zhejiang, and Beijing
Huangmei Opera	Beautiful melody and a touching story and having a wide range of influence on people	Anhui, Jiangxi, and Hubei
Sichuan Opera	Miscellaneous and diverse voices	Sichuan, Chongqing, Guizhou, and Yunnan
Jin Opera	High-pitched but also soft and delicate	Shanxi, Inner Mongolia, Shaanxi, and Hebei
Hebei Bangzi	High-pitched and passionate singing, generous, compassionate, melodious, and melodious	Central and Northern Hebei and Beijing-Tianjin area
Qin Opera	The voice is deep, mournful, and impassioned, and the voice is cheerful, lively, strong, and powerful	Northwest region
Cantonese Opera	Diverse and expressive	Guangdong, Guangxi, Southern Fujian, Hong Kong, and Macau
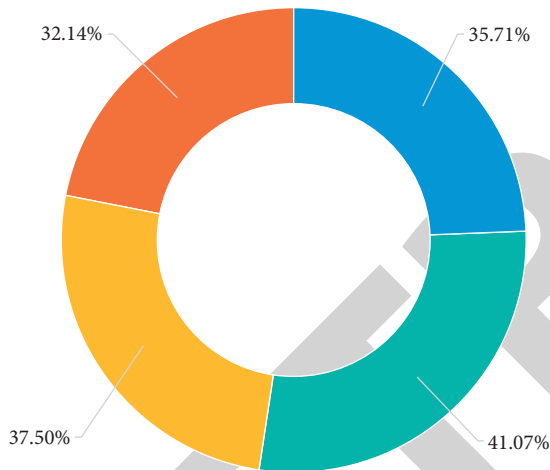
FIGURE 4: Success rate of belt style cultural inheritance.

TABLE 4: Representatives of local operas.

Type	Representative
Yue Opera	Yuan Xuefen; Xu Yulan
Henan Opera	Chang Xiangyu; Wang Xiulan
Pingju	Li Jinshun; Moon Pearl
Kunqu Opera	Liang Chenyu; Tang Xianzu
Huangmei Opera	Yan Fengying; Han Zaifen
Sichuan Opera	Jia Peizhi; Zhou Mulian
Qin Opera	Ma Youxian; Pan Zonghan
Cantonese Opera	Xue Juexian; Ma Shizeng

the works keep pace with the times and make the audience like them. There are various types of art that can attract audiences in the art market now. Local operas are "boating against the current" if they do not create new works. Bobai Guinan Tea-Picking Opera has also found a solution to this problem, analyzed specific problems in detail, and found a breakthrough based on regional characteristics according to local conditions. That is, the Bobai Guinan Tea-Picking Opera will first create a small tea-picking opera based on the stories that are happening around people at the moment and often carry out the activity of "sending the opera into the village," which strengthens the local people's love for the tea-picking opera.

The tea-picking opera in southern Guinan is a very regional type of opera. As a county with the largest population of Hakka in the country, Guangxi Bobai has brought unique advantages to the development of the tea-picking opera in southern Guinan. The Guinan Tea-Picking Opera is an indispensable cultural and entertainment item in the life

of the Hakka people, and it is also a common way for the people of Bobai to connect and express their emotions. Bobai Guinan Tea-Picking Opera has created two large-scale Guinan Tea-Picking Opera works in the past three years. The first is the large-scale Guinan tea-picking drama "Green Pearl Girl." This drama belongs to a new historical drama. The prototype of the story is one of China's top ten beauties, Green Pearl. The work promotes the protagonist's fraternity and dedication and establishes a local character image. Through the performance of the works, the audience can further understand the regional cultural history and enhance the people's national self-confidence. The second part is based on the historical node of the 100th anniversary of the founding of the Communist Party of China, excavating the deeds of Mr. Zhu Xian, the pioneer of Bobai revolution, and creating a large-scale Guinan tea-picking drama "Bagui Pioneer Zhu Xian," which promotes the importance of deepening the learning and education of the party history. The measure aims to cherish the martyrs, inspire future generations, and educate the majority of party members, cadres, and the masses to appreciate the power of faith. The development of Bobai Guinan Tea-Picking Opera can judge the situation, seize the opportunity of the development of the times, tap the regional culture, further improve and polish it, focus on highlighting the national attributes of the regional culture, continue to improve the works, interpret the high-

quality products in a better state, launch the works, and go to the city and the whole district to tour so that the Guinan Tea-Picking Opera can continue to go further and further.

4.2. Improve the Environment, Diversify, and Integrate. The rehearsal field is the guarantee for artistic creation, and the theater is the guarantee for the performance of stage works. A professional opera troupe cannot do without the theater and the rehearsal field. The Bobai Folk Art Conservation, Inheritance and Development Center, Tea-Picking Department is the only professional state-run Guinan Tea-Picking Opera Art troupe in Guangxi, which can be called "the first troupe of Guinan Tea-Picking Opera" in China. In this regard, the current head of the group, Lu Guangdong, knows that changing the environment is one of the problems faced by the troupe's development. To make the tea-picking in Guinan revive, it is necessary to bring out works of higher artistic level and return to the audience's attention. As Bobai Guinan Tea-Picking Opera has actively participated in various theatrical performances in counties and cities over the years, it has been recognized by everyone and has gradually increased the influence of Bobai Guinan Tea-Picking Opera. After reviewing the situation, the head of the group raised the issue of upgrading the rehearsal and performance venues and received corresponding policy support. On the basis of the original rehearsal venue, stage lighting and audio equipment was installed to improve the function of the rehearsal venue. Some daily routines can be completed here. The office building was integrated, and three medium-sized practice halls were renovated. Now that the environment has changed, business and supporting development projects have also been added. First, the training business of tea-picking opera is carried out, and training is provided for some fans and teenagers of tea-picking opera; secondly, in addition to the daily training of actors, the practice hall will also open some singing and dancing classes. It is very important for the development of Bobai Guinan Tea-Picking Opera to better promote the development of this opera to further study how to diversify and integrate development.

4.3. Strengthen Talent Training and Establish New Models. No matter what the cultural system is, strengthening talent training is always a major issue. If Bobai Jinan selected tea drama wants to develop better, it is necessary to start from the cultivation of actors. According to the survey, the specific age distribution of the actors in the selected tea drama is shown in Figure 5. The development of local opera should pay attention to the cultivation of young talents and restore the "hematopoietic function." The development of Bobai Guinan Tea-Picking Opera must start from the cultivation of talents. There must be people for development. Head Lv Guangdong also found a way to develop people and retain people and other issues and formulated a 5-year talent training plan. It is expected to complete the training target of 300 people. The students recruited each year are jointly trained with Guangxi Art School. It is guaranteed to train 50–60 students every year,
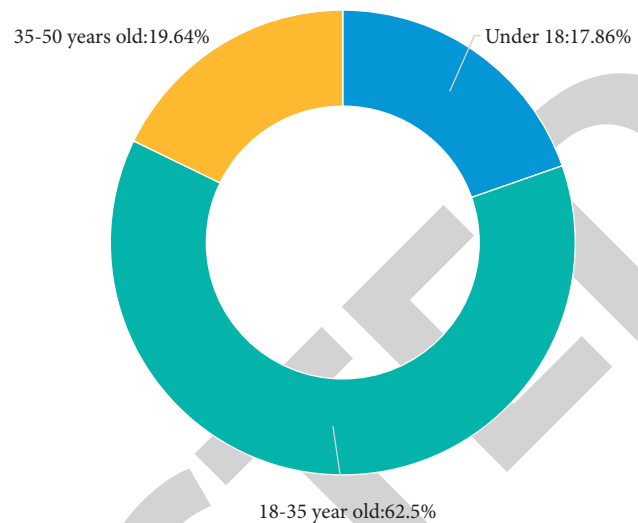
FIGURE 5: The age proportion of the actors selected in tea dramas.

gradually expand the talent echelon of Bobai Guinan Tea-Picking Opera, and develop the performance team of Bobai Guinan Tea-Picking Opera in the direction of refinement, high quality, and elite. The personnel echelon implements classified management and is divided into Guinan tea-picking team, children's art training team, and singing and dancing performance team. The integration and development of Nancai Tea Opera will continue to broaden the future development path; the establishment of a singing and dancing performance team has enriched the types of performances of Southern Guinan Tea Opera and can also connect commercial performances and cultural tourism performances, gradually making Bobai Guinan Tea Opera a professional and diverse stage performance.

5. Conclusion

Traditional opera has been developed for thousands of years. Today, when various modern entertainment forms such as film, television, and the Internet are booming, various artistic activities are widely carried out, and people have more and more space to choose entertainment forms and art appreciation categories. Under the circumstances, its inheritance has encountered unprecedented difficulties, and a large part of local operas have reached an endangered and lost situation, resulting in the movement of people and the dissolution of groups. Therefore, the protection and inheritance of traditional opera cannot rely solely on cultural workers.

Through the analysis of local opera cases, especially the development of local opera and music, this paper tries to solve the inheritance dilemma and proposes the strategies of creating new products, promoting the development, realizing diversification, integrating resources, strengthening talent training, and establishing new models. This paper is important to developing and promoting the practice of Chinese traditional culture in the same research form in the future [20].

Research Article

Research on Legal Constraints of Individual Environmental Data Rights and Interests in Big Data Environment

Yineng Xiao (iD)

School of Health Humanities, Peking University, Beijing 100191, China

Correspondence should be addressed to Yineng Xiao; xiaoyineng@pku.edu.cn

Due to the practical needs, the lack of legal protection, and the lack of attention to these three factors under the existing legal framework of personality rights, these factors together determine the necessity of the establishment of personal information rights. As an emerging right of scientific and technological progress and big data application, how to define the right ownership, right object, and right content of personal information right in theory? Firstly, starting from the theory, this article summarizes the opinions and controversies of the academic circles on the relevant issues and tries to expound its own understanding and views on the basis of comprehensive evaluation. Combined with the introduction to the relevant cases, on the basis of theoretical research, I tried to analyze how to determine the constituent elements of the legal relationship of personal information right in judicial practice, so as to make the theoretical research and judicial practice closely combined. In addition, this article also lists and analyzes the legislative status quo of personal information right protection in twelve countries and regions and expounds three main issues in the legal relationship of personal information right under the background of big data from two aspects of theory and practice: (1) the definition of the scope of personal information; (2) subject identification under the application of network data; (3) a new understanding of the content of personal information right. The conclusion of this article has certain practical significance.

1. Research Status

With the development of information economy, data have become the core factor of production in the era of digital economy, integrating into the process of creating economic value and continuously reconstructing economic and social forms and personal life. However, data opening also brings pressure to information security, and the massive collection and use of personal information has aroused people's concern.

Since the application of computer processing and storage of personal information, the Western society began to pay attention to the protection of personal information [1]. In the Common law system represented by the United States, the legislative protection of personal information emphasizes human freedom, and the protection of personal information is based on the right to privacy. The academic circle also studies personal information for the protection of privacy. The protection of personal information mentioned in many research literatures is essentially the protection of privacy interests reflected by personal information itself. In the study of privacy, Samuel Warren and Louis Brandeis published on Privacy in 1890 [2], which gave a simple definition of privacy, that is everyone has the right to be left alone. The publication of the paper had a profound impact on subsequent privacy legislation in the United States. In addition, various scholars have proposed different types of privacy in subsequent studies. Prosser's 1960 article on Privacy divides the right to privacy into four types, which are recognized by most US state statutes. Daniel J. Solove divides the right of privacy into six types, including personal information self-determination. In the process of the development of the later privacy theory, Whalen v. Roe in 1977 formally established that the information privacy right mentioned by scholars in the 1960s was protected by the Constitution. However, due to the development of

information technology in the era of big data, people's concept of privacy has changed, and personal information that is traditionally considered private is shared on social media. Omer Tene and Jules Polonetsky conclude that technology is driving changes in social perceptions of privacy. Sun Microsystems CEO Scott McNealy predicted [3], "You'll have no privacy. Forget about privacy." However, some scholars have raised objections, saying that privacy will not disappear and stressing the protection of personal information. In contrast, the Recent General Data Protection Regulation of the European Union has strengthened the protection of personal information, and some scholars in the United States have called for drawing lessons from the LEGISLATION of the European Union to formulate a special privacy protection law [4]. Some scholars have also expressed their views on the data portraits stipulated in the REGULATIONS issued by the European Union [5] and proposed that accurate user portraits can realize low-cost and large-scale tracking. In general, the European Union and the United States have established different legislative models, and scholars in various countries have combined their own personal information protection models with practice to provide a theoretical basis for legislation.

2. Legislative Status of the Protection of Personal Information Right

Table 1 shows the legislative status of the protection of personal information right in several major countries and regions.

Due to the popularity of Internet technologies and applications, personal information is collected, stored, mined, and processed on a large scale, which is necessary for business and social management activities, so countries regulate personal information protection through legislation, in which the European Union and the United States appear as representatives. It reflects two different modes of legislative protection respectively. The European Union mainly protects personal information through uniform legislation. In response to large-scale information collection and utilization in the context of big data, continental European countries took the lead in trying to initiate special legislation, with Germany as the most typical. In 1977, the Federal Personal Data Protection Law promulgated by the German Federal Parliament came into effect, which for the first time systematically and centrally protects personal information and standardizes the collection and use of personal information. The 1995 data protection directive for personal information protection legislation system is the European Union [6]. The most basic provisions of the Act are the right to personal information, as well as the obligations of those who collect or process personal information. It plays a very important guiding role in the protection of personal information in EU countries. In 2012, the EU adopted the General Data Protection Regulation (GDPR) [7], which was revised twice in 2014 and 2016. The latest version came into force on May 25, 2018. Compared with its predecessor, the Eu Data Protection Directive, which was adopted in 1995, GDPR is directly applicable to EU member

states, without the need for member states to translate it into national law. The regulation aims to restrict Internet and big data enterprises' processing of personal general information and sensitive information, so as to protect the rights of information subjects [8]. Its application is not limited to the territory of the EU, and the application outside the EU includes two situations: one is to provide goods or services to data subjects in the EU, whether they pay or not; and the second is to monitor the behavior of data subjects in the EU. This means that companies around the world are likely to be subject to the GDPR, which has been described by some media as "the most stringent information protection law in history." To date, GDPR is the most comprehensive legal standard for the protection of personal information (or personal data) in the international community. It sets a new flag for the international information protection movement and has important reference significance. The United States is the first country in the world to put forward and protect privacy right through laws and regulations and has formed a relatively complete legal protection system for privacy right in China. Therefore, the United States adopts the form of accessory protection of privacy—the protection of privacy is the protection of personal information. To be specific, the protection of personal information in the United States is scattered in all walks of life. Associations of all walks of life and their regulatory departments formulate standards and applicable rules for the protection of personal information in their respective fields. There is no unified personal information protection law. For the public, the Privacy Law of 1974, based on the protection of privacy rights, standardizes and restricts the federal government's behavior of collecting, storing, transmitting, and processing citizens' information through the theory of privacy rights, so as to prevent the federal government from infringing on citizens' information. Facing the market, the United States emphasizes economic liberalization, opposes monopoly, and encourages competition. Therefore, the United States pays special attention to industry self-discipline on the basis of free competition. It adopts a decentralized legislation model for various industries and makes "personalized legislation" for problems arising from the collection and use of personal information in various industries. For example, the Electronic Communications Privacy Law of 1986 and the Children's Online Privacy Protection Law of 1998 [9]. To sum up, the United States adopts a comprehensive protection model of "unified privacy protection + industry self-discipline" for personal information protection, in which industry self-discipline is the dominant. It is worth noting that in 1977, the Supreme Court of the United States first analyzed the right to privacy in Whalen v. Roe, which mentioned the concept of informational right to privacy. This case was the first judgment on the collection of personal information in the United States. Although it did not formally establish the right to information privacy at the legislative level, it indirectly acknowledged its existence, which greatly promoted the development of privacy theory.

Scholars' discussion on personal information right has experienced a transition from privacy to personal

TABLE 1: The legislative status of personal information right protection.

Region	Related legislation	Remark
European Union	Data Protection Directive, 1995	The general data protection regulations were further revised in 2014 and 2016, with the latest version coming into force in May 2018. To date, it is the latest and most comprehensive legal document on personal data protection in the international community.
	Directive No.95/46/EC/ of the European Parliament and of the Council on entry protection relating to the processing of entry data and the free circulation of such data, 1995 European Union Privacy Directive, 1998 Privacy and Electronic Communications Directive 2002 European Union Data Retention Directive, 2006 Draft No.2012/72 and 73 on the protection of individuals in relation to the processing of personal data and the free flow of such data, 2012	
European commission	General data protection ordinance, 2012 The 1981 convention on the protection of individuals in the automated processing of personal data was amended, 1999 Additional agreement on regulatory authorities and cross-border data flows to the convention on personal protection in the automated processing of personal data, 2001 Convention on personal protection in the processing of personal data, 2012	
Germany	The German state of Hesse enacted the Data Law of Hesse, the world's first specialized personal data protection law, 1970 Germany enacted a national Federal Data Protection Act, 1977	The Federal Data Protection Act of 1977 stipulates that only with the consent of the parties concerned can personal data be collected, processed, and used, and the data parties have the right to know, correct, delete, and screen.
Sweden	Swedish Data Act 1973 Personal Data Act 1998 (supersedes the former)	The world's first national personal data protection law
France	Information, Records and Freedom Act, 1978	
Britain	UK Data Protection Act, 1984	
Australia	The Privacy Act 1988 was passed in November 2012 and the Privacy Act Amendment Act came into force in March 2014	
Japan	Personal Information Protection Act, 1988 Law on the protection of personal data of administrative bodies in relation to computer processing, 1990 Personal Information Protection Act, 2003	
Malaysia	The Personal Data Protection Law was passed in 2010 and came into force on November 15, 2013	
America	The Fair Credit Reporting Act, 1970 Bank Secrecy Act, 1970 Fair Information General Rules, 1973 Privacy Act, 1974 Financial Privacy Act, 1978 Family Educational Rights and Privacy Act, 1978 Privacy Protection Act, 1980 Electronic Communications Secrecy Act, 1986 Federal Electronic Communications Privacy Protection Act, 1986 Computer Comparison and Privacy Protection Act, 1988 Telemarketing Consumer Protection Act, 1991 Consumer Credit Reporting Act, 1996 Children's Online Privacy Protection Act, 1998 National Cybersecurity and Critical Infrastructure Protection Law, 2002 Consumer Information Privacy Act, 2010 Internet Privacy Protection Act, 2012 Federal Privacy Act, 2014	

Table 1: Continued.

Region	Related legislation	Remark
	California Online Privacy Protection Act, 2014 Privacy Shield Agreement, 2016	
Netherlands	Data Registration Act 1988; Personal Data Protection Act, 1999 (supersedes the former)	The Personal Data Protection Law of The Netherlands enacted in 1999 stipulates the following principles for government agencies to collect personal information: Personal data processing shall be carried out in accordance with the law and in a reasonable and appropriate manner; the collection of personal data must be accurate, authentic, and legitimate; the data subject has made an explicit consent to its own data processing; the processing of personal data should not exceed the scope of the data acquisition purpose; after the purpose of collection and processing of personal data is realized, the personal data shall not continue to be stored in the form of data subject being identified.
New Zealand	Privacy Act, 1993	There are 12 information privacy principles: The purpose of collecting individual information is legal; personal information comes from the person himself; rules for collecting information from the person; storage and security of personal information; get entry information; modify the input information; review of alignment and accuracy before use; the agency shall not hold personal information for longer than necessary; restrict the use of incoming information; restrictions on the disclosure of personal information; unique identification marks, etc.
OECD	Guidelines on privacy protection and cross-border flow of personal data, 1980	
United Nations General Assembly	Guidelines on specification of personal data documents for computer processing, 1990	
APEC	APEC Privacy Framework, 2004	
Taiwan, China	Computer Processing of Personal Data Protection Act, 1995	It regulates schools, hospitals, telecommunications, finance, and insurance.
	Personal Data Protection Act, 2012	The scope of use is extended to all industries. According to article 6, it classifies sensitive personal information based on whether it is related to individual core privacy, including "personal INFORMATION related to medical treatment, gene, sexual life, health examination, and criminal record."
Hong Kong, China	Personal Data (Privacy) Ordinance, 1996. The Personal Data (Privacy) (Amendment) Ordinance was enacted in June, 2012	

information right. Scholars Samuel Warren and Louis Brandeis for the first time published their views in American public journals, believing that privacy is the right of individuals to freely enjoy the privacy and tranquility of their personal life that is exclusive of interference and intrusion. Right to be alone is emphasized [10]. Other scholars have linked the right to privacy to aspects of an "intimate" or "sensitive" person's life, defining the right to privacy as "a state of control over intimate areas of decision-making, including decisions about intimate access, intimate information, and intimate behavior." From the right to privacy to the right to personal information. With the continuous development of the information society, the application of Internet technology has caused a huge impact on human life [11]. Scholars gradually realize that in modern society, more positive factors should be injected into the right to privacy

and the right holder should be given the right to actively protect his personal privacy. After the promulgation of the Privacy Law of the United States in 1974, scholars began to attach importance to the ability of information itself to control its information and put it into the connotation of privacy. Scholars Daniel Solove and Paul Schwartz believe that the protection of privacy is the active control and domination of information subjects over their own information. Alan Westin's definition of privacy takes information control as the core and believes that privacy means that the subject of right has the right to independently decide when, how, and to what extent the information related to himself will be transmitted to others [12]. Scholar Charles Fried believes that the mode of privacy protection should not follow the passive form of the past. On the contrary, with the development of society, people begin to perceive that their

personal information should be controlled by themselves [13]. Katrin Schatz Byford, a scholar, defined privacy as "the right to control the dissemination of information about oneself" [14] from a positive perspective.

With the continuous development and in-depth study of these theories, the connotation of privacy gradually began to change, so the concept of "personal information right," which emphasizes information control, emerged at the right moment [15]. The definition of personal information right. In the case of German census in 1983 [6], the court referred to the right of personal information as the "right of information self-determination," which mainly means that the subject of information, that is the person to whom the information is directed, controls his or her own information in accordance with the law and decides the flow and use of information according to his or her own will. Therefore, the definition of personal information is particularly critical. According to scholars James B. Rule and Graham Greenleaf, personal information refers to the information that can be directly connected with the identity of a specific individual, or can point to a specific individual in combination with other information. Therefore, identification is the key point to judge personal information. In addition, some scholars believe that only by relying on certain media and being recorded can personal information be called personal information [16]. This is also the second key to personal information judgment, which is treatable. On the relationship between personal information right and privacy right [17], scholars generally agree that the protection of privacy or the protection of personal information right reflects the individual's independent decision on his or her life and reflects the individual's personal dignity and freedom. Whiteman, an American scholar, believes that privacy is the core of maintaining individual dignity and personal freedom. As far as personal information is concerned, people pay more and more attention to it not only because of its gradually prominent property value, but also because of its embodiment of personal dignity and personal freedom [18]. The right to personal information is also known as the "right to information self-determination," and its connotation also includes the protection of individual personality interests [19]. To protect the personal information of information subjects from technical processing, its core value also lies in the protection of the personal dignity and personal freedom of information subjects [20].

3. Constituent Elements of Legal Relationship of Personal Information Right in the Context of Big Data

3.1. Scope of Personal Information. As mentioned above, the object of personal information right is personal information. As a new legal concept, different countries have different understandings of personal information, which can be reflected in the appellation of legislation related to personal information in different countries. Some countries call it "personal data," such as Germany's Federal Data Protection Law; some countries called "personal privacy," such as Australia's privacy Act. Therefore, before studying the scope of its protection, this article believes that it is necessary to clarify the relationship between personal information and personal data, personal data and personal privacy, and have a clear understanding of the distinction between each other.

3.1.1. Distinction between Personal Information and Related Concepts. Both personal data and private data come from the English word "personal data," which has different titles due to different translations. There is no substantial difference between them, but both are related to personal identification. Generally speaking, personal information is equivalent to personal information, refers to all information related to the individual, and personal information is only a kind of external presentation of personal information. Similarly, if personal information is stored on a computer or on the Internet, it becomes personal data. Although there is a view that private data or personal data is more focused on the form of information carrier and external performance, personal information is expressed by the information content itself, and the information interaction between the information subject and the content reflects the information between the information subject and the perception subject, which is more inclusive and stable. However, this study believes that the core of personal information, personal data and personal data is the corresponding content of information, rather than what form of information is presented. Therefore, from this point of view, personal data and personal data are no different. In addition, some people believe that the word "data" comes from the English word "data," which itself is a plural noun. Therefore, data emphasizes the collection for a certain purpose. Then the so-called data (data) is formed by summarizing and recording one piece of information within a certain range. In other words, data is a collective form of information, but there is no essential difference between data (data) and personal information in terms of its core meaning, that is content. Therefore, there is not much discussion on the distinction between the three in academic circles, and the three are often mixed in the legislation of various countries. Compared with personal data and personal data, the legal title of personal information is more humanistic. Therefore, in today's information society, most countries also take personal information as the conceptual basis of their legislation. At present, the academic circles are discussing the relationship between personal information and personal privacy. From the point of view of right status, personal privacy is the form of personal information that the information itself does not want to be disclosed to the outside world in daily life.

There is no limit to states, they can be public or private. In addition, in the context of today's big data, the storage of information has far exceeded the past, and the generation of big data makes the content of personal information complex and diverse. Privacy (especially private information) is only a part of personal information. In this regard, scholars represented by Professor Wang Liming believe that compared with personal privacy, the scope of personal information is significantly wider. At the same time, there is a certain

connection between personal privacy and personal information: some personal information, such as mobile phone number and ID number, belong to privacy, but some personal information, such as name and gender, do not belong to privacy. Scholars represented by Professor Zhang Xinbao believe that there is a cross-relationship between personal information, which is not only a sensitive part closely related to personal life but also a category of privacy. However, with the need of social interaction, personal information such as name and contact information is more mobile, so it is no longer classified as privacy. As for the relationship between personal information and personal privacy, scholars mostly discuss about the scope of the two, or the coverage of the object, and there are mainly two viewpoints: the distinction theory and the crossover theory. In the process of literature reading, this article found a new perspective to distinguish and compare personal information and personal privacy, which deserves attention.

Firstly, the connotation of the two is analyzed: Compared with the concept of "personal information," as the object of privacy, personal privacy means that private life is not disturbed, and private information confidentiality is not illegally collected and disclosed. It can be seen from its expression that personal privacy emphasizes the undisturbed state of a person's private life. It cannot refer to a specific matter and is an abstract concept, while personal information is a specific concept and refers to the information that can directly or indirectly refer to a specific individual. Secondly, there are great differences in value judgment between the two, so it is inappropriate to compare them at the same level. To be specific, personal privacy is the judgment of others on the degree of intrusion into the party's private domain. Due to the need of social communication, each person's private life more or less will be open to others, the private sector is invaded by others, which means that everyone with a certain tolerance obligation; however, the obligation of tolerance is not unlimited. If the degree of intrusion of others on the subject of information is too deep and serious, it infringes on the privacy of the obligee. Therefore, personal privacy is result-oriented and judged by the consequences caused by the violation. Personal information refers to the information that can identify or point to a specific individual and is judged by the identification and directivity of the information itself. In terms of privacy, we can state that a message is personal, but if the context mentions privacy, we cannot determine whether the message belongs to personal privacy, since privacy issues involve value judgments, need combined with specific facts, the influence of the parties, their subjective feelings, and etc., of comprehensive judgment, and personally identifiable information is a question of fact judgment. To sum up, in view of the difference in value judgment and definition between personal information and personal privacy, the two should be clearly distinguished and should not be confused.

3.1.2. Division of Personal Information. Personal information can be divided into sensitive personal information and nonsensitive personal information based on sensitivity [21].

Sensitive personal information, as its name implies, refers to information that directly involves sensitive areas of an individual's private life. According to China's Personal Information Security Regulations, which took effect in May 2018, sensitive personal information refers to personal information that will cause great physical and mental damage or property loss once disclosed or improperly used. EU went into effect in 2018 during the same month the general data protection ordinance, which is about "sensitive personal data" regulation: disclosure of racial or ethnic, political opinions, religious or philosophical beliefs, or trade union members of personal data or can be used to identify specific personal biometric data, such as fingerprints, genetic information, etc. By contrast, nonsensitive personal information refers to information that does not directly involve sensitive areas of a person's private life. According to the Swedish Personal Data Law, nonsensitive personal data/information refers to information that clearly does not pose a great threat to the privacy of the information itself. As mentioned earlier, identifiability is a key factor in determining personal information. Therefore, based on identifiability, personal information can be divided into direct personal information and indirect personal information. Direct personal information refers to the information that itself can be directly associated with a specific individual, that is the information that identifies the information itself. It can be seen that direct personal information has a strong personal directivity, which directly and uniquely corresponds to the information itself. Common direct personal information includes genetic information, fingerprint information, ID number, etc. Indirect personal information refers to the information that itself does not directly point to a particular individual, but after the multiple correlation analysis of information can point to specific personal information, such as name, interests, skills, and talents, and job information such as financial status must be associated with their names, work units, and other information to identify information points to themselves. Under normal circumstances, courts generally protect direct personal information as personal privacy, while there are great controversies in judicial practice regarding the protection of indirect personal information, which will be discussed in detail in the next section.

3.1.3. Determination of Personal Information in Judicial Practice. In China's judicial practice, personal information is mainly protected under the existing framework of privacy right. According to the mentioned in this article, the personal information of infringement cases, courts can be found in that one kind of personal information is protected, more to whether it involves the privacy interests as the judgment standard, the dispute focus on personal information can judge and privacy interests identification measures, such as personal privacy information comprehensive recognition. Specifically, when hearing cases related to personal information, the court will categorize personal information according to the degree of sensitivity. The specific division has been discussed in the previous section and will not be

repeated. As sensitive personal information is closely related to the personal dignity and personal freedom of the information itself, the public can generally know that the information itself has strong personal dependence on such information and is reluctant to disclose it to others. Under normal circumstances, sensitive personal information is not allowed to be freely disseminated to the outside world without the permission of the person. Therefore, the court will identify the infringement of such information as privacy infringement, and there will not be much controversy in general. The most controversial cases are those involving general personal information (i.e., nonsensitive personal information) such as names, telephone numbers, addresses, and workplaces. Due to the need of social communication, information such as name and work unit has a high degree of openness, and most people will define it as personal general information. Therefore, whether such information is protected by law needs to be analyzed in specific cases. In tandem with the arrival of big data, new technologies are continuously emerging, among them the construction of a cloud platform and distributed computing provides a basis of big data storage security; artificial intelligence for large data intelligent analysis, mining, and boosting the role of the application of ascension and the application of sensors in the IoT allow for increased access to data. The so-called personal information refers to all kinds of information that can directly or indirectly identify natural persons. It refers to the name, date of birth, ID number, fingerprint, marriage, occupation, marriage, health, property, social relationship, and associated information of natural persons. Any information that can uniquely determine the attribute information of an individual is called personal information. "Personal information" refers to personal information that is private, confidential, hidden, and not intended to be made public. Privacy is a subset of personal information, as shown in Figure 1.

3.2. Subject Identification under Network Data Application

3.2.1. Whether Legal Person (or Other Social Organization) Is the Subject of Personal Information Right. Information protection of legal persons (or other social organizations). Legal person (or other social organization) is a legal subject, because of the need to participate in social production and business activities is endowed with rights and capabilities, enjoys legal rights, and bears legal responsibilities. It is true that legal persons (or other social organizations) also produce a large amount of information during their existence, which is more or less related to the vital interests of legal persons and the purpose of their establishment. However, just as there are essential differences between natural persons and legal persons (or other social organizations), there are still partial differences in the information directed towards them: information protection for natural persons is aimed at maintaining personal dignity and freedom, while information protection for legal persons (or other social organizations) is centered on their economic interests. Due to their differences in value orientation and legislative purpose, the
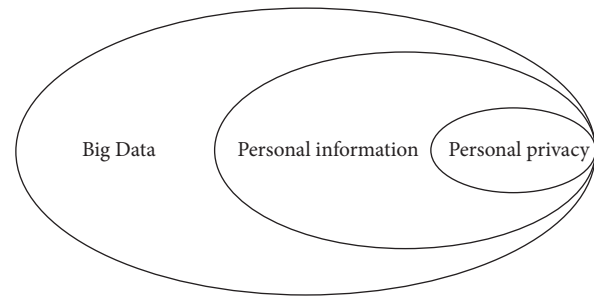
FIGURE 1: The relationship between big data and personal information and privacy.

established system itself will be different and cannot be adjusted through the same law. Therefore, in the relevant legislation of various countries, the vast majority of countries adopt separate legislation, that is, the information protection of legal persons is separated from the personal information protection law and protected in separate legal norms. For example, The Federal Data Protection Law of Germany does not adjust the data protection relationship related to legal persons, but there are provisions to protect legal persons' information in the Communication Law and the Data Protection Regulations of the Communication Service Industry. In addition, in Chin's legal system, the "personal information" of legal persons, namely trade secrets, can be infringed with the help of anti-unfair competition law, and a special trade secret law may be issued in the future to protect it. Therefore, the subject of personal information right discussed in this article is only limited to natural persons, excluding legal persons and other social organizations. Of course, I do not exclude the possibility and necessity of incorporating legal persons' information into the personal information protection system in the future with the development of society.

3.2.2. Whether the Information Collector Has the Right to Personal Information. When it comes to the application of big data in real life, a large amount of personal information is in the hands of commercial subjects and public authorities. Then do these information collectors have the right to personal information? I believe that the answer is no. The subject of personal information right is still the natural person who produces the original information, that is, the person to whom the information is directed, not the collector of the information. In today's Internet era, all personal information have high liquidity, people's personal information will not be in the form of express or implied government departments or commercial organizations to collect, information gatherer is not the subject of right of personal information at this time, because they only shall have the right to the information that I hereby authorize the limited content, information will be collected in a particular way for a particular purpose. Unlike the information itself, it does not enjoy the complete power to control and dominate its own information, such as the right to deal with inquiries, the right to raise objections, the right to delete requests, etc. Therefore, in the context of big data, the right to personal information only belongs to the information producer (i.e.,

the person to whom the information is directed), rather than other information collectors or information users.

3.2.3. Whether Information Subjects Are Protected in a Virtual Network Environment. In the network environment, most people publish their information under virtual names, but the information subject in reality has the right to personal information. They just virtualize their real personal information through the network, but the value of their personal information is not diminished, and it still reflects the personal interests of the real information subject. Therefore, the subject of personal information right in the virtual network environment is the real natural person corresponding to the information, rather than the virtual name subject in the virtual network environment. However, due to the virtuality and complexity of cyberspace, it is necessary to determine whether the personal information of the real subject under the virtual name in the network environment is protected by law in judicial practice. With the popularization and application of the Internet, the protection of personal information in the virtual network environment has gradually been concerned. The review process of the newly published Civil Code on Personality Rights (Second Review draft) in April 2019. Some members suggested adding provisions on the virtual identity of civil subjects in order to solve disputes over personal information infringement in the online world. I think that this proposal has its rationality, but how to stipulate it and its legislative effect still needs further discussion and research.

3.3. A New Interpretation of the Content of Personal Information Right. As for the content of the right of personal information, it is generally believed that the right of personal information should be reflected in the ability of the information itself to decide and actively control its own information. In terms of the content of the right of personal information, some scholars think that the right of personal information should include the right of information self-determination, the right of information management, the right of permission to use, the right of prohibition to use, and the right to profit. In addition, some scholars believe that information subjects' control over their personal information can be reflected in the following aspects: The person has the right to independently decide whether and how his/her information will be collected and utilized, request others to keep his/her personal information confidential, check the status of his/her personal information when it is collected and processed by others, request to modify or delete his/her wrong information, and request others to pay for the use of personal information. Previous scholars have discussed the interpretation of the right content in terms of controlling and dominating the information itself, but this type of control and dominance is not realistic when considering how to end a number of processing behavior, such as possession, use, open, transfer and analysis, modify, delete, etc. Therefore, I want to interpret the content of personal information right from a new angle. As mentioned above, under the background of big data, personal information

right is a new type of right with both personality attributes and property attributes, and personality attributes play a dominant role. In this sense, the right content of personal information right can be divided into personal information personality right and property interest from the perspective of law and economics, so as to reflect the independent value of personality and property use value of personal information, respectively. Specifically, the other benefits of personal information are mainly for the information itself to obtain certain economic benefits, or for a social evaluation or service. The right of personality aims to maintain the integrity and correctness of personal information and personal information in the process of free circulation. The external image of personal information is made to become a kind of real information. Specifically, according to the different stages of information circulation, personality interests include the right of informed consent in information collection, the right of inquiry in information processing, and a series of intervening rights to object to the processing activities of information controllers.

3.3.1. Personal Right of Personal Information. Personal information personality right refers to the integrity and correctness of information in the process of free circulation, so as to realize the value of personal dignity of information. Compared with the passive defense mode of privacy of personal information in the past, personal information personality right in the context of big data emphasizes the active control and domination of the subject of personal information. According to the different stages of information circulation, this control and domination can be further divided into two stages: The first is the stage of information collection, that is the acquisition of personal information by others from the information itself; and the second is the stage of information processing, that is the stage of information processing after the completion of information collection. Focusing on the two stages of information circulation, I believe that the content of personal information personality right can be summarized as follows: First, the right of informed consent enjoyed by personal information in the stage of collection. That is to say, the user of information collection must obtain digitization of the information subject to collect and process its information, and Iization is out of the real will of the user, not forced consent under the obvious unequal status of the two parties. For example, for many applications on people's mobile phones, users must authorize operators to access the mobile phone address book, mobile phone album, and other permissions in order to obtain effective services. However, some access permissions are obviously not necessary for providing such services, and excessive collection of users' personal information exists. Personal information is in the acquisition phase, therefore, must obtain information, express or implied consent, this point is not only reflected in the information control people when collecting users' personal information must be in a reasonable way comprehensive, clear let me know the scope of information collection, the purpose and content will be processed, and information

collection should follow the principle of minimization principle and the necessity. Any collection and use of information that goes beyond reasonable limits and beyond what is socially necessary to tolerate requires a re-authorization of the information itself. That is to say, if the information collection and processing company conducts operations beyond the scope of the initial authorization of the information subject on the user's personal information collected, it must obtain Iization of the information subject again (i.e., Iization of secondary utilization), otherwise it will constitute the violation of the informed consent right of the information subject. Second, the inquiry right of information subject to its information processing process. The existence of access right is of great significance for the information subject to realize its effective control over its own information. This right endows the information subject with the right to control the processing state of their personal information in real time, so as to effectively balance the unequal status between the information subject and the information controller and reduce the burden of proof of the information subject in the process of proof. In the judicial judgment of personal information protection in China, there are countless cases in which the plaintiff fails to provide sufficient evidence, although some scholars believe that special cases can be applied.

The burden of proof rule is used to coordinate the relationship between the information subject and the information collector, but I think that giving the information subject the right to query its information processing process is more conducive to the protection of personal information. No matter the burden of proof is inverted or reduced, this special burden of proof rule can only play a role in the process of litigation. For the right subject of personal information, it always belongs to the result of infringement in the process of litigation relief. it not only have exposed relief. Moreover, the right of access to personal information can make the information subject show real-time supervision and information collection and processing behavior before the infringement occurs, which is a preventive behavior in the nature of relief. Compared with the relief effect achieved by the special burden of proof rule, the personal information access right is obviously more advantageous. Third, the information subject has a series of intervening rights to object to the information controller's processing and utilization activities. The power can be viewed as the right of the above query subsequent power, found in information subject by querying the handling and use of their personal information conditions do not conform to the prior agreement, or harm the interests of my possibility, information main body in the process of information processing and utilization of information acquisition for disposal, seeking the relief to protect its own information. For example, if the information controller is found to have shared the collected personal information with a third party without authorization, the information controller may be required to stop processing and using his personal information and bear the corresponding tort liability. If the information controller is found to have disclosed wrong personal information, the information subject has the right to request correction or modification of the wrong information,

or even withdrawal or deletion of the information that distorts the true image of the information.

3.3.2. Property Interests. With the rapid development and widespread application of Internet information technology, personal information has been collected on a large scale and used in various commercial activities and social management activities, and its use value is particularly prominent. Under the function of market economy, the use of personal information can be reflected as a kind of property value and gradually become the wealth of citizens in the information society. The property interests of personal information can be reflected in the following two rights: first, the right to use information. This kind of information utilization has two meanings: the first layer can be expressed as the information subject's use of his personal information to meet his own needs according to his will. For example, information subjects voluntarily provide their personal information in order to obtain certain economic benefits or exchange for certain services. The second layer can be expressed as permission or restriction of information utilization other than information itself. For example, information subjects have the right to authorize others or forbid others to collect and process their personal information and have the right to require information collectors to use their information in a legitimate way within a reasonable range. Second, information usufruct. The biggest difference between the right to personal information and the right to privacy is that the information subject enjoys the right to profit from the use of his personal information, which is also the most prominent feature of the property right of personal information. It is worth noting that this right of earnings is not only expressed as the use of personal information to obtain direct economic benefits, but also can be expressed as the use of personal information in exchange for some social evaluation or service. Comparison in life.

It is common for job seekers to actively disclose their basic identity information, educational background, work experience, etc., in order to gain positive evaluation of the interviewer and ultimately succeed in the job search. Phone number and location are disclosed when using mobile ordering software to get food delivery service.

4. Discussion

In the current information society, people are increasingly aware of the importance of personal information, which has set off a tide of legislative protection of personal information in the world. The majority of domestic researchers believe that our country should develop a specific personal information protection law as quickly as possible, but this article acknowledges that due to the complexity of the personal information itself, the future of personal information protection law must also provide a framework of general provisions; for the regulation of personal information in the circulation of each hyperlink is still relevant, specific legal rules must be established accordingly. In addition, the protection of personal information can not only rely on

upper-level legislation, but also need the active participation and cooperation of relevant regulatory departments, people engaged in various industries, and citizens. For the purposes of this article, we will mainly study the legal complications related to the right of personal information, describing the problems associated with personal information protection, such as how to carry out by the competent authority of the market regulation, how practitioners in each field of information security compliance, personal information in the process of circulation of different stages, etc. It may involve the knowledge principles of science and technology law, administrative law, information law, and other disciplines. In view of the limited academic ability of this article, the consideration of the above problems is not mature. I believe that in the subsequent research of scholars, these problems will be properly solved, so as to better grasp the balance between personal information protection and utilization and promote the sustainable development of China's digital economy.

5. Suggestion for Personal Information and Privacy Security Protection Measures

In this article, the four ways to protect personal information are proposed as:

5.1. Strengthen Industry Self-Discipline and Realize Self-Protection of Personal Information. The arrival of big data brings new challenges to personal information security. In recent years, countries all over the world have formulated relevant laws and policies to protect the privacy of individuals and ensure the security of personal information and privacy from disclosure. National laws and regulations is not perfect; however, China's laws and regulations, in particular, are too scattered. Legislation lags behind, disclosure of privacy can not be timely and effective punishment, which has become a prominent problem in the current social development. In order to strengthen industry self-discipline, industry standards are formulated according to the characteristics of the industry itself. Industry members should be encouraged to consciously abide by the rules and regulations for the protection of personal information, a sound industry internal management system and basic operating procedures should be established, and an initiative must be taken to accept the work guidance of public security organs and network supervision departments. Data collectors are guided to reasonably collect user information under the legal framework. The state and the industry shall establish special inspection and supervision mechanisms, advocate punishment and accountability systems, cultivate the moral quality of the industry personnel, form a good sense of social responsibility, strengthen the awareness of abiding by the law, and strictly regulate the collection and use of all kinds of data in the flow of information—clear personal information.

The qualifications of the collection and collection channels should be legal, and the purpose of using information should be informed to the holder of personal information. In the process of information storage,

anonymous processing should be carried out so that the information subject cannot be identified, and transparency of the process of data transfer and circulation should be strengthened.

5.2. Improve Citizens' Awareness of Personal Information Protection. To protect personal information security, we can not only rely on the establishment and improvement of laws and regulations, strengthen industry self-discipline and improve the internal rules and regulations of enterprises, but also need to improve the awareness of personal information protection and protect their information security from the root. To develop good Internet habits, ambiguous websites should not be browsed or used. When using mobile devices such as mobile phones, Settings must be checked first and personal information must be protected. Therefore, from the national level, we can promote the protection of personal privacy in the media. We should strengthen the publicity of information security awareness, issue personal information security literature and thoroughly implement it, hold popular science lectures regularly, and release citizens' information security knowledge by using some network platforms. The government should include the protection of personal information into the protection and standardization of national strategic resources.

5.3. Establishing and Improving Laws and Regulations. The era of big data network increases the risk of personal information security to a large extent and makes it easier to leak personal privacy. Therefore, it is urgent to establish a set of perfect and operable personal information protection system; introduce "personal Information Protection Law" and "Privacy Law" as soon as possible; and make up for the legislative gap of personal privacy protection in our country. In the legal regulations, the following aspects of personal rights and obligations are mainly concerned. First, the obligation of clear disclosure. In China, citizens have weak awareness of personal information security, and enterprises or organizations should clearly inform information providers of the right to know and control when collecting personal information. Second, the way and purpose of use should be clarified. Information collectors and users should specify the purpose, storage location, scope, and period of use of collected personal data in detail. According to the policy requirements, personal information providers have the right to delete and modify, and excessive collection is not allowed. Again, pay attention to personality right, that shall not be arbitrarily filming, recording, leak, tracking the private activities of others, not for himself agreed to open, without authorization, buying and selling private information, such as personal privacy being invaded and take corresponding legal measures to stop, for mental damage to apologize restorable, information and economic compensation. In addition to bearing civil liability for the property loss of the victim, serious and harmful acts should be included in the category of criminal crime. Government supervision should be strengthened, a set of security assessment system must be established and implemented

under the legal framework, and enterprises and individuals should be guided to strengthen the collection and management of private information. In addition, the accountability mechanism and punishment for the disclosure of individuals should be strengthened and foreign advanced management methods and laws and regulations should be learned to restrain the illegal behavior of enterprises or organizations.

5.4. Strengthen the Research on Personal Information Protection Technology in the Big Data Environment. At present, countries in the world take certain technologies to protect personal privacy from different perspectives, such as data encryption technology, data anonymization technology, data fuzzy technology, data interference technology, and differential privacy protection technology, to improve the efficiency of personal information.

Data Availability

The experimental data of this study are available from the corresponding author upon request.

Conflicts of Interest

The author has no conflicts of interest for this study.

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Research Article

Impact Analysis of Environmental Regulation and Improvement of Agricultural Economic Efficiency on Living Environment Based on Systematic GMM Model

Jiahui Zhu (ID),[1] **Bin Zhou,**[1] **and Wenhan Li**[2]

[1]*Xi'an University of Science and Technology, Xi'An 710000, China*
[2]*University of Surrey, Surrey, Guildford GU2 7XH, UK*

Correspondence should be addressed to Jiahui Zhu; 21117002011@stu.xust.edu.cn

The living environment is of vital importance to human beings and is also the basis for their survival and development. Along with the accumulation of people's production and living experience, people are seeking their own development while studying the living environment more deeply. In recent years, various regions and departments have conscientiously implemented the relevant decisions and deployments. They have promoted the construction of rural infrastructure and the equalisation of basic public services between urban and rural areas, so that the rural living environment can be gradually improved. The rapid development of urban-rural integration has brought great opportunities and challenges for rural development, making rural development issues increasingly complex and affecting the effectiveness of the construction of a new rural habitat. At the same time, the agricultural economy is the basis of national economic development, and the ecological environment provides a certain amount of material environment for the development of the agricultural economy. Therefore, research on the harmonious development of the agricultural economy and the ecological environment has always been a hot issue for the authorities concerned. After all, China's agricultural economic development mode is characterized by a rough-and-ready approach, and the agroecological environment continues to deteriorate, leaving the issue of sustainable agricultural development to be resolved. What is worse, in the practice of agricultural production, the related agricultural activities have brought serious pollution to the environment. Specifically, the carrying capacity of the agricultural ecological environment is declining, leading to an increasingly serious conflict between sustainable agricultural economic development and the construction of an environmentally friendly and resource-saving society. In China, although the industrialization process is accelerating, the agricultural population still accounts for a large proportion of the population. As people's living standards continue to improve, a favorable living environment has become an urgent need for farmers. As a result, strengthening the construction of rural infrastructure, improving rural living conditions, and improving rural environmental sanitation are important issues that need to be addressed urgently. Therefore, to further investigate the impact of environmental regulation and agricultural economic efficiency on the habitat, this study constructs a systematic GMM model using panel data for 30 provinces and regions in China from 2011 to 2021.

1. Introduction

Since the reform and opening-up, China's economic growth has been driven by a combination of internal and external factors, such as marketization, and it has moved from a rough and tumble stage of development to a modern and fine-grained transition stage. Accordingly, China's economic development has resulted in the upgrading of its agricultural industry. From Figure 1, it can be seen that the agriculture industry is the most important industry in China. As a basic industry for China's economic construction and development, agriculture should pay more attention to the coordinated and sustainable development of the agricultural economy and the agroecological environment to further consolidate the basic position of agriculture in the development of the national economy. Agriculture is a combination
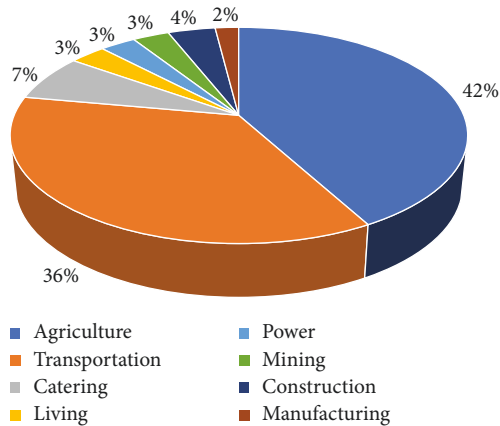
Figure 1: Share of GDP by industry in China in 2021.

of natural and economic reproduction processes [1]. Changes in agricultural factors and technological conditions result in a differentiated distribution pattern of agricultural industries. As a result, it is the most correct choice in China's economic construction to adhere to the strategic policy of achieving high-quality agricultural development and improving the efficiency of the agricultural economy [2]. Also, the construction industry is quite important in China [3, 4]. At present, most regions in China have basically modernized their agriculture, and the development of rural industries has entered a phase of urban-rural industrial integration and high-quality agricultural development. The overall efficiency of China's agricultural economy is constantly improving, and market-based reforms are to blame. The level of marketization is a powerful driver of economic growth, and the diffusion effect of its externalities on the productivity of the three industries is an important force in ensuring high-quality economic growth [5]. The higher the level of marketization, the greater the evidence of market dynamism, and the higher the utilization of economic resources in a given region. Thus, it is important to investigate whether marketization can contribute to the growth of input and output efficiency in China's agriculture, which can contribute to the sound development of China's agricultural economy.

However, the rapid development of Chinese agriculture has also brought about a contradiction between environmental construction and market-oriented agricultural development. Agricultural pollution still exists because of the low utilization of agricultural resources, low penetration of technology, and other reasons, such as the high cost of agricultural inputs and the degradation of ecological production patterns. The ecological environment is the sum of all the forces or effects of the natural environment that are closely related to human life and affect human survival and development, and it is the basis for sustainable socio-economic development [6]. The agroecological environment is the collective term for the various elements that directly or indirectly affect the survival and development of agriculture, and it is an important part of the ecological environment and the material basis for agricultural economic development. In agricultural production, humans have a negative impact on the agroecological environment to a certain extent [7].

Hence, it is important to pay attention to the development of the agroecological environment at the same time as developing the agricultural economy. At the same time, the increase in income from agricultural products is closely linked to the use of fertilizer inputs, which will, in turn, lead to a considerable degree of safety risks for the quality of agricultural products [8]. The disparity in agricultural development between different regions not only affects the efficiency of agricultural production but also limits the sustainable growth of Chinese agriculture as a whole. It is evident that environmental controls have an impact on the development of the agricultural economy [9]. As a pillar of China's economic development, it is important that agriculture should adhere to a green-oriented development path.

Behind the rapid development of the agricultural economy is the deterioration of the agroecological environment and the unsustainability of agricultural development. Also, how to achieve the coordinated and sustainable development of the agricultural resources-saving, environment-friendly, and agricultural economy is the focus of research by the relevant departments [10]. Most of the existing research results are based on the agroecological perspective or the agroeconomic perspective, with both the agroecological assessment index system and the agroeconomic development index [11–13]. In addition, there are also specific measures to protect the agroecological environment and regulations and policies to develop the agricultural economy. Most of the research results on the coupling of agroecological environment and agricultural economy are based on national ecological and environmental development strategies or national agricultural development strategies [14, 15]. However, these studies do not focus on the factors influencing the agroecological environment and the actors of the agricultural economy. Even if there are studies that focus on the logical relationship between the agroecological environment and the agricultural economy, they simply assume that the agroecological environment is a condition for the development of the agricultural economy, or that the agricultural economy is an influencing factor of the agroecological environment [16]. In other words, they have failed to explore the coupling and synergy mechanisms between the two from a systemic perspective. As a result, from a systemic perspective, it is essential to develop new research perspectives and focus on the role of microlevel factors and actors in the agricultural economy, which is relevant to the discussion of agroecological environment and agricultural economy.

Agricultural ecological economic system is a compound system with specific energy conversion and material circulation rules, which is formed by the interweaving of agricultural ecological environmental system and agricultural economic system. In the agroecological economic system, people use a variety of technology and economic measures to carry out the regulation and control of the whole system, and the input of various resources makes the potential material and energy in the ecological environment resources contribute to the output of various agricultural products [17]. From the perspective of the system theory, the coupling mechanism of the agroecological economic system and

agroeconomic system forms the complex relationship in the process of agroecological economic system reproduction, which is manifested as the reciprocal feedback mechanism between agricultural ecoenvironmental system and agricultural economic system [18]. The agricultural ecological environment system is the base of agricultural economic system. Agricultural economic system is the leading system of agricultural ecological environment system, and technological system is the intermediary between agricultural economic system and agricultural ecological environment system. The detailed framework of agricultural ecological economic system can be seen in Figure 2. Agroecological economic system is connected with agricultural production activities through different factors and carries out material circulation, energy flow, information exchange, and value transfer in the system [19]. Therefore, the agroecological economic system can show the characteristics of the unity of ecological environment and economy.

In fact, improving the rural living environment is of great significance to rural modernization. First of all, the construction of the rural living environment can provide a natural foundation for the construction of a beautiful countryside [20]. Because of the development of urbanization and industrialization, pollution control and resource protection are the primary objectives of rural human settlement environment construction in China. Industrial and household pollution is the main threat to the rural ecological environment, and many rural areas cannot even guarantee the basic drinking water safety [21]. The degradation of vegetation and the overexploitation of resources also put the ecosphere at risk. Over the past decade, China has made remarkable achievements in environmental protection in rural areas, which provides an ecological background for building beautiful villages. Secondly, the construction of the rural living environment can provide material basis for the construction of a beautiful countryside. Improving the rural living environment requires the construction of standardized housing, road transportation system, safe drinking water facilities, stable power supply network, drainage system, and other infrastructure [22]. These facilities are the material basis for ensuring the convenience of rural residents and living in a safe and clean environment. In addition, the construction of a rural living environment can provide the institutional foundation for the construction of a beautiful countryside [23]. To be specific, the construction of a rural living environment includes the development of democracy at the grassroots level and the creation of a fair social environment, so that the government and the people can act in accordance with laws and abide by them. It is necessary to improve the democratic supervision mechanism, protect the rights and interests of farmers, enhance their trust in the government, and make them full of hope for their future lives [24]. The perfection of the system is an important factor in the management of democracy and can provide a safe guarantee for rural residents to live and work in peace and contentment. After all, at this stage, the per capita disposable income of rural residents in China is on a steep upward trend and growing at a fast pace (Figure 3).
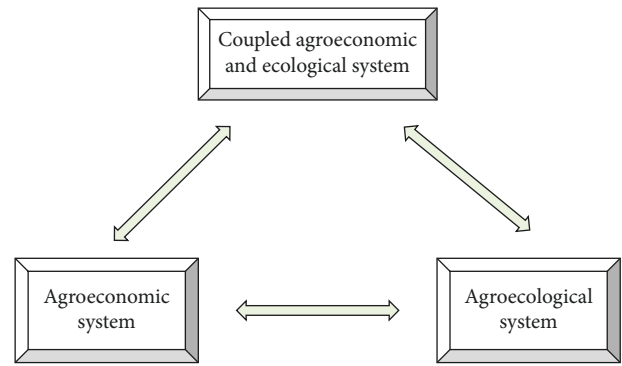
Figure 2: Framework of agricultural ecological economic system.
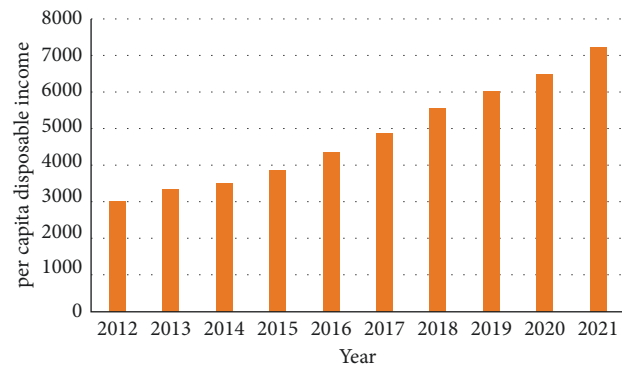
Figure 3: Per capita disposable income of rural residents in China from 2012 to 2021.

The GMM estimation method, which makes the orthogonal condition of the sample moment corresponding to the population moment implied by the economic model close to zero, has many advantages [25]. Firstly, the parameters of the objective function can be estimated without solving the stochastic equilibrium. Secondly, no special assumption is required for the joint distribution function of observable variables. Finally, any econometric model for which orthogonal conditions can be established can be estimated using the GMM method. The externality of instrumental variables and their correlation with endogenous variables are two very important assumptions for the use of GMM in empirical studies [26]. However, if there is only a weak correlation between the instrumental variable and the endogenous variable, a series of weak instrumental variable problems will occur. The existence of a weak instrumental variable will make the sample distribution of GMM estimation or instrumental variable estimation non-normal distribution, and the general conventional and standard statistical inference is not reliable. The weak instrumental variable problem is not a small sample problem but will also occur in large samples [27]. As a result, the subsequent development of GMM estimation in the dynamic panel model mainly follows three ideas to solve the problem of weak instrumental variables or improve their limited sample performance: improving the original instrumental variables, screening the instrumental variables in the set of instrumental variables, and using bootstrap sampling.

To sum up the realistic background, theoretical background, and policy background, the benign interaction and sustainable development of agricultural ecological environment and agricultural economy and the existing problems and research status need interdisciplinary cross-study. At the same time, it is necessary to explore the logical relationship and coupling principle between agricultural ecological environment and agricultural economy using the system view and coordination thought, to deeply analyze the target of the coordinated development of coupling system, and to take targeted policies to promote the coordinated development of an agricultural ecological environment and agricultural economy coupling system. At the same time, in view of the significant regional characteristics of agricultural ecological environment and agricultural economy, this study takes agricultural ecological environment and agricultural economy as the research object and focuses on the coordinated development of regional agricultural ecological environment and agricultural economy coupling system. What is more, marketisation is the economic driving force to improve China's agricultural production efficiency, while environmental regulation is the environmental driving force to improve its efficiency. The two complement each other and jointly promote the development of agricultural economy. On the premise of following certain environmental regulations, it will certainly have an impact on the growth of agricultural economy based on the different degrees of the market stage. Therefore, this research deeply explores the relationship between the three and discusses how market and environmental regulations directly affect agricultural production efficiency. On the basis of the traditional research, the interaction between the two is introduced, which not only enriches the research perspective but also analyzes whether the environmental regulations under the constraints of different marketization levels will affect the agricultural production efficiency of other changes.

2. Relationship between Environmental Regulation and Agricultural Economy

The coupled agroecological environment and agricultural economy system consists of the agroecological environment subsystem and the agricultural economy subsystem, as well as various actors. As a result, this system contains both the diversity of the agroecological environment and the diversity of the interconnectedness of the agroecological environment along with the agricultural economy. The boundaries within the coupled system and between the subsystems are more blurred, the functions are more diversified, and the system is characterized as an environmental social system.

2.1. Coupling System. The structure of the coupled agroecological and economic system is mainly oriented toward the interests of the actors involved in the coupled system. Through the life and production activities of the actors, the system consists of the input and output of different elements that form the material, energy, value, and information flows within the coupled system. In addition, the system can maintain a relatively stable and orderly development, thus forming the structural framework of the coupled system with the characteristics of wholeness, relevance, and hierarchy. As shown in Figure 4, the structure of the coupled system can be divided into three levels, namely the factor level, the economic and social level, and the actor level.

At the factor level, the main focus is on the form of movement and the laws of movement of the elements within the coupled system. This level can embody the primary and natural state of existence of the coupled system and is the basis and precondition for the other structural levels. At the economic and social level, the links between the elements in the system are strengthened through economic, political, cultural, and legal means. Furthermore, this level regulates the relationship between the agroecological environment and the agricultural economy, thus promoting the synergistic development of the coupled system. At the level of actors, the government, the market, and farmers are both participants in the coupled system and promoters of its harmonious development. On the one hand, it is necessary to respect the objective laws of the agroecological environment and the agricultural economy. On the other hand, it is also necessary to consider the development intentions of the actors to combine various natural, economic, and social conditions and to apply scientific and technological methods and tools to enhance the sustainability of the agroecological environment and the agricultural economy, thus promoting the synergistic development of the coupled system.

2.2. Objective of Developing Coupling System. The sustainable evolution of the coupled agroecological and agro economic system is fundamental to its synergistic development. In addition to this, the system is also an objective law that guides the interconnectedness and common development of all elements within the system. The goal of synergy in the coupled system is to focus on the integrated benefits of the economy, society, and the ecological environment. Without harming the agroecological environment, it is important to ensure that the economic development of agriculture meets the development needs of present and future generations. As a result, as shown in Figure 5, the objectives of the synergistic development of the coupled system are reflected in the three levels of efficiency and intensification, coordination and harmony, and the sustainable evolution of the coupled system.

At the present stage, China's agricultural economy is generally in a state of inefficient development, resulting in a low degree of intensification in the coupled system of agroecological environment and agricultural economy. The coupled system is characterized by the high input of resources, a relatively low output of agricultural products, the high consumption of agricultural production materials, and the deterioration of the ecological environment. In addition, the efficiency of agricultural production is generally lower than that of urban industries and lower than that of the agricultural economies of developed countries. To change the inefficient and sloppy development model, it is necessary to establish a scientific coupled system with ecological, economic, and social objectives and highlight the development model of high
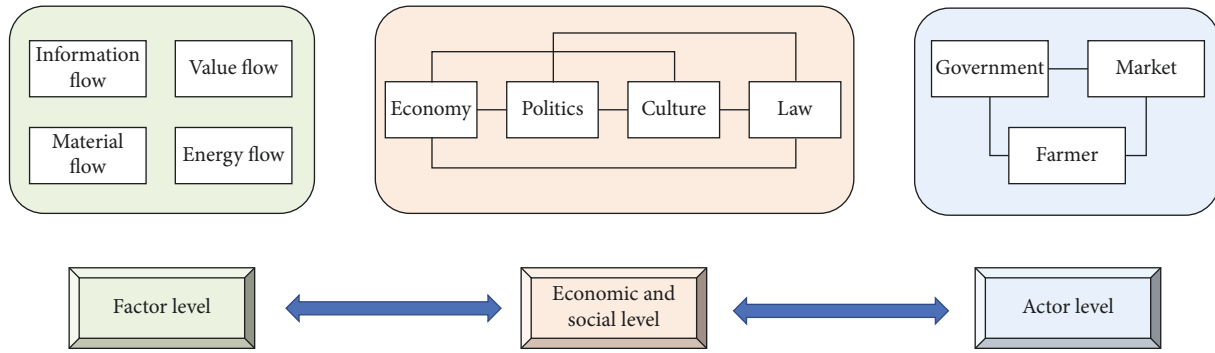
FIGURE 4: Structure of the coupled system.
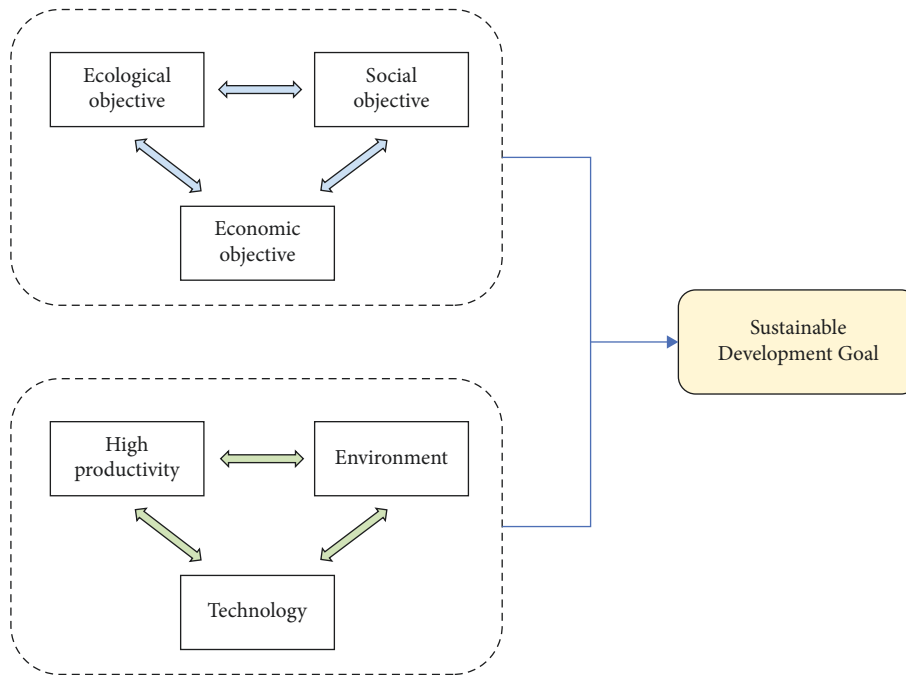
FIGURE 5: Objectives of synergistic development of the coupled system.

efficiency and intensification. In terms of ecological objectives, there is a need to unify direct and indirect ecological objectives to improve resilience to disasters and risks and maintain ecological security and sustainable and stable growth in ecological efficiency. In terms of economic objectives, through the positive impact of the market on the agroecological environment, a model of efficient and intensive development of the agricultural economy will be formed to promote the sustainable development of the agricultural economy. In terms of social objectives, the reform of the agricultural economic system will be deepened on the basis of the realization of ecological and economic objectives. In addition, it is necessary to establish an efficient and intensive ecological and economic development mechanism to realize the goal of efficient and intensive development of the coupled system of the agroecological environment and the agricultural economy.

2.3. Market Behavior Analysis. The market is the dominant force in the allocation of resources in the coupled agroecological and agroeconomic system, regulating the use of agricultural economic resources. However, because of limited rationality, externalities, and information asymmetries in the market environment, the public goods attribute of the coupled system of the agroecological environment and agricultural economy is more obvious. The coupled system is an organic link between the natural and man-made environment of agriculture, and the acquisition of agricultural outcomes is the result of the combined effect of natural resources and agricultural production. On the one hand, the production of agricultural outcomes is driven by the maximization of market interests. On the other hand, the scarcity and finiteness of natural resources inevitably require a certain limit to agricultural production, which results in the existence of a difference between private marginal costs (PMC)
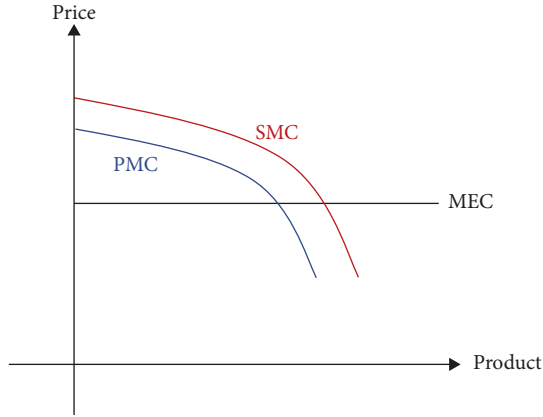
Figure 6: Relationship among PMC, SMC, and MEC.

and social marginal costs (SMC) under market behavior, i.e., marginal external costs (MEC), as shown in Figure 6.

An important way forward for agricultural development also lies in the advancement and application of science and technology. The strategy of storing food in the land and food in technology is being implemented in depth to improve the level of security of the supply of food and other agricultural products. Firstly, it is necessary to actively enhance the level of innovation in agricultural science and technology, make full use of the resource advantage of abundant species resources, and encourage universities and research institutes to innovate, develop, and promote good crop seeds and cultivation techniques. Secondly, it is necessary to strengthen the supporting role of science and technology in agricultural development, transform scientific and technological knowledge into economic strength, enhance the technological content of agricultural products, and increase the contribution of science and technology to agricultural growth. What is more, it is necessary to vigorously promote and strengthen the status of agricultural science and technology in the development of the agricultural economy position, so that grassroots farmers can be the first to learn about the latest agricultural information.

3. Applications of Systematic GMM Model

3.1. Model Setting. In this study, dynamic panel data models are used to optimally estimate the parameters of the correlation coefficients. Dynamic GMM estimation is generally divided into two categories. In the differential GMM estimation model, the panel data advances over time and inevitably raises more instrumental variables. On the other hand, the systematic GMM model is based on differential GMM methods and can effectively overcome the endogeneity problems that arise within the model. As a result, the systematic GMM estimation method will be chosen for this research.

To further investigate the relationship between marketization, environmental regulation, and agricultural economic efficiency, it is necessary to test whether marketization and environmental regulation can directly affect agricultural

economic efficiency. Therefore, the models constructed are as follows:

$$aee_{i,t} = \alpha_0 + \alpha_1 aee_{i,t-1} + \alpha_2 mkt_{i,t} + \alpha_3 er_{i,t},$$
$$aee_{i,t} = \alpha_0 + \alpha_1 aee_{i,t-1} + \alpha_2 mkt_{i,t} + \alpha_3 er_{i,t} + \alpha_4 (mkt^*er)_{i,t}.$$

$$(1)$$

Here, *aee* refers to the agricultural economic efficiency in each province, $mkt_{i,t}$ refers to the marketization in each province, and *er* indicates the environmental regulation in each province.

3.2. Variable Selection. Given that the model in this study involves nonexpected output, it is not possible to deal with this effectively based on the SBM model. E is the desired optimal efficiency value, where $E = 1$ represents the strong efficiency of the decision unit. p and q represent the input and output quantities, γ is the radial planning parameter, and β is the linear combination correlation coefficient of the decision units selected for this research. Therefore, the obtain equation is as follows:

$$E = \min \gamma - \sum_{i=1}^{p} \frac{q_i}{\beta_i}, \qquad (2)$$

such that

$$\left\{ \sum_{j=1}^{q} \beta_j + \gamma = p\beta_j \geq 0 q_i \geq 0. \right. \qquad (3)$$

Furthermore, the input of the above model can be seen in Table 1.

3.3. Empirical Testing. In this section, the systematic GMM model is applied to conduct the empirical testing for the related data of each province. To be specific, the results of the dynamic panel data model estimation are shown in Table 2.

The results in Table 2 show that environmental regulation and the level of marketization have a positive effect on the efficiency of the agricultural economy. Specifically, the more integrated the market environment in each region, the stronger the positive externalities of the agricultural economy. It can lead to the development of other agricultural industries in the region. At the same time, with the disappearance of market barriers, regions with backward agricultural economies can communicate with developed regions by learning new agricultural production techniques. They can continue to improve their own use of agricultural resources to increase local agricultural productivity.

The results for environmental regulation are also consistent with the findings of traditional studies. It can be concluded that the necessary environmental regulations are conducive to increased agricultural productivity. As the agricultural environment is a public good and pollution is highly external, it is no longer possible to rely solely on the internal mechanisms of the market to solve environmental pollution problems, and the inequality between inputs and outputs in the implementation process is only at the expense of greater economic costs. Therefore, strong environmental

Table 1: Input of GMM model.

Input indictor	Factor
Labor input indictor	Number of people working in agriculture
Land input indictor	Arable land and aquaculture area
Water input indictor	Total agricultural water consumption
Energy input indictor	Total electricity consumption in agriculture

Table 2: Result of the dynamic panel data model estimation.

	Model (1)	Model (2)
aee	0.425	0.367
	0.000	0.000
mkt	0.025	−0.302
	0.000	0.01
er	1.342	1.045
	0.000	0.000
Constant	−3.389	−3.769
	0.000	0.000
mkt*er		0.491
		0.000
Sargan	1	1
AR (1)	0.0074	0.0243
AR (2)	0.2013	0.318

regulation is an important tool to compensate for and control these failures. By regulating the amount of agricultural resources to be used in each region to improve the efficient allocation of resources, this approach to production is ultimately closely linked to the overall development of regional agriculture.

In the model (2), the interaction term is added, and there is a negative effect of environmental regulation. It suggests that environmental regulation has a dampening effect on the efficiency of agricultural production. It argues for the importance of rational use of agricultural resources. In the initial stages of agricultural production, China's overall ecological carrying capacity is high, chemical emissions, such as pesticides, are not too polluting, and farmers consciously follow environmental regulations to ensure a high harvest for their families, which, to some extent, ensures an increase in agricultural production efficiency.

4. Conclusion

Based on the findings of this study, the policy recommendations that are made to improve China's agricultural economic development from the perspective of marketization and environmental regulation are as follows: firstly, the market should play a decisive role in the development of the rural economy in terms of resource allocation. Learn to rely on the power of the market to continuously promote effective linkages between agricultural production and agricultural trade in different regions of China. In addition, it is necessary to ensure that the actual factors of agricultural production in each region can be distributed and circulated on a larger scale. Also, it is necessary to eliminate the protection of local markets by local farmers, so that a large

market can be established with an orderly competition of resources. It will enable regions lagging behind in agricultural development to benefit from the mutual assistance of their neighbors while giving a full play to their comparative advantages. At the same time, each region needs to formulate the necessary environmental regulations in accordance with the actual situation of the local agricultural economy, especially with regard to the regulation of agricultural production. It will ensure a steady increase in production efficiency and the full use of market and government forces to ensure quality agricultural development. However, there may be some bias and inevitably some subjectivity in this study with regard to the selection of indicators. As a result, in the future, a more in-depth empirical study can be conducted to verify the validity of the systematic GMM model, starting from the selection of indicators.

Data Availability

The labeled datasets used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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Research Article

Research on the New Ecological Model under the Environment of "Double Reduction" of Children's Community Education Services

Jing Zhou [ID]

School of Humanities, Geely University of China, Chengdu 641402, Sichuan, China

Correspondence should be addressed to Jing Zhou; rwzhoujing@bgu.edu.cn

Children are the hope of building a powerful, modern-socialist state. In recent years, all social classes have paid more and more attention to children's enlightenment education, and the country began to implement the double reduction policy. As the main place for children to live and grow, the community has the responsibility and obligation to conduct the education of children. Work and effective development and utilization of community education resources can greatly meet the needs of children's growth, help children develop good behavior habits, and lay a solid foundation for future education. Through the experimental survey results, this paper discusses the theoretical basis for the development and utilization of community children's education resources under the dual emission reduction policy, puts forward the corresponding development principles, and analyzes the main strategies to improve the efficiency of social education.

1. Introduction

In recent years, in accordance with the decisions and arrangements of the Party Central Committee and the State Council, all localities have carried out in-depth efforts to reduce the burden of homework and off-campus training (hereinafter referred to as "double reduction") for students in the compulsory education stage [1]. But one of the most prominent problems in compulsory education now is that primary and secondary school students are too burdened, and the problems of short-sightedness and utilitarianism have not been fundamentally resolved [2]. On the one hand, students' homework burden is still heavy, and homework management is not perfect; on the other hand, off-campus training is still overheated, and the problem of advanced and overstandard training has not been fundamentally resolved [3]. Illegal behaviors, such as "difficulty in refunding fees" and "running away with money" by training institutions, have occurred from time to time [4]. These problems have resulted in the heavy burden of students' homework and off-campus training and the heavy financial and energy burden of parents, which has seriously offset the achievements of educational reform and development, and it has had a very

bad impact on society [5]. The Party Central Committee attaches great importance to this, and from the strategic height of realizing the great rejuvenation of the Chinese nation, it has made important decisions and arrangements for the "double reduction" work. Education policy implements the fundamental task of Lide Shuren and promotes the all-round development and healthy growth of students [6]. At present, my country's educational undertakings have been vigorously developed [7]. The Party Central Committee has paid more and more attention to children's education, actively developed and utilized community educational resources, improved the community's ability to guide children's education, and strived to create a learning, friendly, and united community [8]. Educational atmosphere: However, in the process of developing and utilizing community educational resources, there are also problems such as unclear goals, difficulty in developing resources, and uncooperative personnel [9]. Therefore, it is necessary for the community to strengthen management, clearly recognize the importance of community educational resources to children's growth, and actively develop and use effective community education resources to create a good environment for children's growth and learning [10].

Parents and students get along day and night. As the children's second teachers, their words and deeds also affect the children's learning [11]. It is very important to fulfill their legal guardianship duties. First, open home-school contact [12]. Actively participate in parent meetings and parent schools, actively communicate with teachers, understand students' learning and physical and mental conditions, formulate targeted home-school linkage education programs, and build a harmonious home-school relationship [13]. The second is to update the concept of parenting. Understand the law of children's physical and mental growth, improve their own educational quality and ability, rationally plan the future development direction of children, and do not blindly send children to participate in off-campus training [14]. The third is a harmonious family atmosphere. Carefully pay attention to the changes in children's thoughts and emotions, listen to their voices, be their friends, form a good communication and interaction model, and help children solve problems [15]. The fourth is to guide students to make good use of their time at home. Encourage your child to go to bed on time and ensure adequate sleep [16]. Moderately arrange housework, strengthen physical exercise, carry out parent-child reading, etc. Strengthen the supervision of children's online behavior and timely detect, stop and correct children's online addiction [17].

Society is the environment of education, and it is necessary to give full play to the resources of all parties to provide an important platform for students to broaden their horizons, develop in an all-around way, and practice exercises [18], as shown in Table 1.

2. Relevant Theoretical Basis for the Development and Utilization of Community Educational Resources

The development and utilization of community education resources are not blind but also need to be guided by a relevant theoretical basis. Figure 1 contains three aspects: ecological theory, constructivism theory, and the theory of "life education."

2.1. Ecological Theory. Bronfenbrenner, the founder of human development ecology, believes that "The environment in which individuals develop is an ecosystem that spreads from small to large, and each system affects the development of individuals in a certain way. These environments exist specifically in the life of individual development in different forms, such as schools, families, communities, the entire social culture, and the interaction process and connection between individuals and their environment and between environments and environments [19]. This theory reveals to us that schools, families, and communities all have important influences on children's development. Long recognized and valued for the vital role of the family and school for children, now we need to recognize the important influence of communities in children's development. The lives and development of children are influenced by the community, and this influence becomes more widespread as the

child matures. The magnitude of this influence also depends on how the community develops and utilizes various resources [20].

The ecosystem is the place where human beings live and grow. Human life is a group, and it is difficult for any individual to grow and develop without society and others. In the theory of human development ecology, it is proposed that the development environment of each person is a system that expands layer by layer from small to large, and each layer of the system will have a certain impact on the growth and development of the individual. These influences include families, schools, communities, etc., and the systems at all levels also interact to bring learning and living resources to individual growth. From the ecological theory, it can be seen that the community plays an important role in the growth stage of children, which will have a great impact on children's thinking, cognition, and behavior habits. More extensive and far-reaching, this impact will also depend on the development and utilization of community educational resources. The effective development and utilization of educational resources will guide children to establish correct thinking and cognition and play a positive role; otherwise, it will be detrimental to children.

2.2. The Theory of Constructivism. Constructivism is a theory about knowledge and learning, which emphasizes the initiative of learners, and believes that learning is a process in which learners generate meaning and construct understanding based on the original knowledge and experience. The constructivist theory originates from the study of cognitive development and has important implications for understanding the process of children's learning and development. The two representatives of constructivism are Piaget and Vygotsky. Piaget emphasized individual construction and believed that the development of children's cognition stemmed from the interaction of subject and object. He emphasized that "the action of the subject, that is, the interaction between the subject and the object, is the source of all experience and knowledge. Only when children act on the environment can the development of their cognitive structure be guaranteed." Piaget advocated that children learn through active manipulation of physical objects, Encouraging children to discover problems by themselves, formulate their own hypotheses, collect data and verify their own conclusions, and provide children with a rich and diverse educational environment. These ideas can be a guide for child caregivers. Vygotsky emphasizes social construction and believes that social culture has an important influence on children's knowledge construction. "Vygotsky believed that the establishment of all higher cognitive processes results from mutual contact with society. By participating in the common activities of more mature members of society, children gradually master these activities and develop them in ways that are meaningful in their culture. Way of thinking." Piaget and Vygotsky emphasized that children's development is achieved through the manipulation of things and interaction with people, so in the process of developing and utilizing community educational

TABLE 1: Social education methods.

1	Providing venues and resources for off-campus activities	The youth palaces, youth activity centers, research and practice education bases (camps), museums, and other off-campus activity venues at all levels must adhere to the principle of public welfare and increase the opening hours, especially after 3:30 pm, weekends, winter and summer vacations, etc., are open to primary and secondary school students.
2	Exploring community education services	The community should build a student activity center to provide a place for students to participate in social practice, club activities, and volunteer services after school.
3	Propagating the concept of scientific education	All kinds of news media should actively publicize the concept of scientific education, strive to get rid of utilitarian phenomena, such as "rush-run culture," do not hype the ranking of test scores and the rate of admission, and create a good atmosphere for social education.
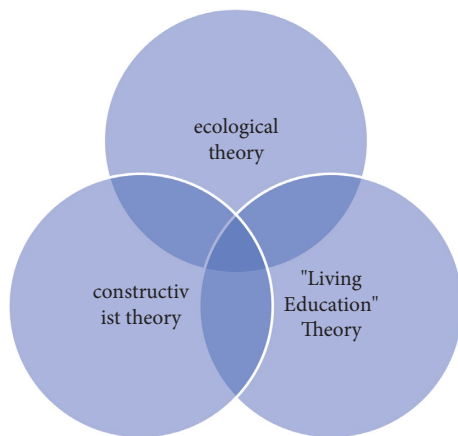
FIGURE 1: Relevant theoretical basis for the development and utilization of community educational resources.
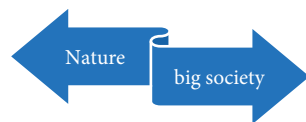
FIGURE 2: Two important factors in child development.

resources, educators need to actively develop and utilize things and the elements of people.

Constructivism theory mainly originates from the study of human cognition and plays an important guiding role in the development and utilization of children's educational resources. This theory holds that the development of children's cognition is mainly affected by the interaction between the subject and the object. When children act in the living environment, their cognitive construction will be greatly improved. At the same time, the development of children's cognition is a process of continuous exploration and creation. Children need to operate in the living environment, discover problems, put forward hypotheses, explore problems, and finally draw conclusions, or solve problems. Therefore, the community can provide enough knowledge answers for children by establishing a community children's library, interest corner, and other ways— a place that satisfies children's exploration and cognition of the world. In addition, Vygotsky, a researcher of constructivism theory, believes that social culture also plays an important role in children's growth and cognitive construction and proposes that all more advanced cognitive

processes need to be in contact with society. Only when members communicate with each other can they help children deeply understand social life and culture.

2.3. The Theory of "Living Education.". The life educational theory system is composed of the purpose, principle, and basic way of life education, as shown in Figure 2. Mr. Chen Heqin, a Chinese children's educator, studied a series of excellent foreign educational theories and ideas while studying in the United States. After returning to China, he devoted himself to Sinicization and scientific exploration of advanced educational ideas and put forward the theory of "living education" according to China's national conditions. In the theory of "living education," Chen Heqin emphasizes that "nature and society are living textbooks." Chen Heqin believes that knowledge in books is indirect and formalized, and only nature and society are the real sources of knowledge. A living book, a living textbook. Chen Heqin uses nature and society as teaching materials for living education, as shown in Table 2. On the one hand, because nature and society are the sources of knowledge, the knowledge it provides to children is the most vivid, intuitive, and vivid, and it avoids any formalized links and artificial intelligence. It is easy to form children's correct concept of things. On the other hand, education that fits children's life through nature and society is also the education that can stimulate children's interests the most. Children like to be active in nature and the big society. Nature and society are the worlds of children and the environment in which children live. In view of the importance of nature and society in the development of children, we should pay full attention to these two factors in the development and utilization of social educational resources.

Therefore, the development and utilization of community educational resources are of positive significance to children's growth and life. It has strong theoretical support and has been explored and researched by countless people, which is in line with the psychological characteristics and interests of children's learning.

3. Principles of Development and Utilization of Educational Resources for Children in the Community

Some principles also need to be upheld in the development and utilization of community children's educational resources, as shown in Figure 3, including the following three principles, which will be introduced later.

Table 2: "Living education" theory.

1	Nature and society are the sources of knowledge, and many human wisdom and creations are condensed in nature and society. Using them as teaching materials for children's education can be more vivid and intuitive while avoiding other forms of distortion and changes. Let children directly feel the correct values
2	Showing educational materials for children in nature and society is richer and can greatly mobilize children's enthusiasm. Children are more willing and accepted to learn knowledge in nature and society, explore the unknown world, and change the rigid and rigid preaching form; the enlightenment to children's souls is more profound and lasting

3.1. The Principle of Subjectivity.

The so-called principle of subjectivity means that children should be the main body in the development and utilization of community educational resources, breaking the previous state of being dominated by adults, and must fully consider the characteristics and needs of children. Dewey once pointed out that children have four instincts, namely, the instinct of inquiry, the instinct of social interaction, the instinct of art, and the instinct of manufacture. The positive growth of children depends on the realization of these instincts. In these instinctive activities, children's interests are stimulated, and their subjectivity is fully exerted. The inspiration from Dewey's point of view is that in the development and utilization of community educational resources, we should take into account the realization of children's instincts and arrange objects for inquiry, social space, artistic atmosphere, and production opportunities.

In the past, the community education method was relatively backward, and the teaching mode was relatively simple and outdated. Some communities did not fully develop and utilize educational resources and did not pay attention to children's teaching, making it difficult for children to play their dominant position; children lose the initiative to learn, have no interest in community teaching, and overtime will also produce boredom, which is not conducive to children's growth and learning. Therefore, the development and utilization of community educational resources need to adhere to the principle of children as the main body, clarify the main position of children in the development and utilization of community educational resources, take children as the core, and explore and utilize educational resources from the perspective of children. Break through the stereotyped or adult-led education model. Children have the instincts of inquiry, socialization, art, and manufacture. Therefore, the community needs to provide more facilities and equipment for children so that children can explore and learn independently. For example, place exploration materials, or facilities in the square so that children can make the desired item.

3.2. The Principle of Suitability.

The so-called suitability principle refers to the suitability of community educational resources for children. This suitability includes two aspects: one is the suitability of the age, and the other is the suitability of the individual, as shown in Figure 4.

Age suitability emphasizes that the community should have educational resources for children of different ages, such as suitable venues and pavements for toddlers and safe large sports venues and facilities for children aged 2–6.
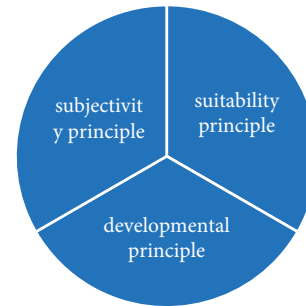
Figure 3: Principles of development and utilization of educational resources for children in the community.

Individual suitability emphasizes that community resources should consider different individual needs. There are various types of resources that can meet the individual needs of children. For example, sports resources meet the needs of sports children, library resources meet the needs of reading children, and science and technology museum resources meet the needs of exploratory children.

The development and utilization of community educational resources must be suitable for children's growth and development, and scientific and reasonable teaching materials should be provided according to children's psychological characteristics and interests. First of all, the community should start from the age of the children. Generally speaking, the general age of children is between one and six years old. They are curious, eager to learn, and have a strong interest in learning new things. Therefore, the development of community education resources should be divided into different types according to the age group of children. For example, children aged 1–4 should teach them to know things, give them innovation and freshness, provide surprises at any time, and stimulate their enthusiasm for learning. Secondly, children's education should not be rushed, it should be done gradually, and it is too late. According to the needs of children's age, they should be provided with suitable teaching resources. At the same time, the infrastructure should also meet the learning needs of children. The development and utilization of community resources cannot rely solely on adults. Willingness should fully consider the growing needs of children and provide fresh and suitable learning resources in order to guide children to grow up healthily in the community.

3.3. The Principle of Development.

The so-called developmental principle refers to meeting the actual needs of children while focusing on the future development of
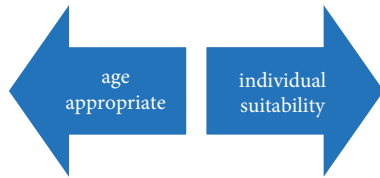
FIGURE 4: Two aspects of the suitability principle.

children. The development and utilization of community resources do not only focus on the visible transient development of children but also on the sustainable development of children. At the same time, the developmental principle is also reflected in promoting the overall development of children rather than one-sided development. For a long time in the past, adults have paid much attention to the cognitive development of children and neglected the development of emotions and skills. Holistic development requires attention to the harmonious development of children's cognition, emotion, and skills. According to Gardner's theory of multiple intelligences, every child has multiple intelligences, but each child exhibits different dominant bits of intelligence. In order to meet the group needs of children's development, the community needs to have rich and diverse resources and to meet the individual needs of children's development. The community needs to have individualized resources and community organizations, to answer questions about children's personal development at different stages or to provide some effective advice on their personal development according to their own interests. The diversification and individualization of community educational resources will promote the individualized development of children.

The development and utilization of community educational resources need to focus on the future development and growth of children. It cannot provide children with flashy educational resources. It should proceed from reality and keep pace with the times, keep up with the trend of the times, and combine the most cutting-edge and cutting-edge educational resources. Advanced concepts of children's education uphold the principle of child development so as to ensure the continuity and long-term nature of community education resources. The development and utilization of community educational resources should be based on the overall situation, not just the current and one-sided attention. In the past development of community educational resources, some communities ignored the developmental principle, and the learning resources provided for children lacked integrity. At the same time, they paid too much attention to children's cognitive and behavioral abilities and often neglected to cultivate children's emotions. Therefore, the community needs to provide children with a variety of learning resources according to the needs of children's development, cultivate and improve children's behavior habits and emotional cognition, and ensure the development and utilization of community educational resources. Diversified and personalized enrichment development.

4. Strategies for the Development and Utilization of Educational Resources for Children in the Community

According to the relevant theory and principle analysis mentioned above, the strategies shown in Figure 5 can be used in the development and utilization of community educational resources for children.

4.1. Development and Utilization of Natural Resources.
Every community is different, but all have certain natural resources. Natural resources generally refer to the natural conditions (natural environment elements) that exist in nature and can be used by human beings, including land resources, water resources, climate resources, and biological resources. There are three main reasons for the development of resource resources.

4.1.1. Natural Resources Provide Children with Rich Emotional Experiences.
Children may live in cities, suburbs, or rural areas, and each type of community has different resources, but all provide a rich emotional stimulus for child development, and children can observe different aspects of nature in their own communities. Children in rural areas can see small animals, such as poultry, livestock, and various types of crops, and they can also see cute insects such as butterflies, bees, and dragonflies more easily; children in cities can see many open parks. Flowers in the garden and animals in the zoo, etc. Children in the north see poplar, willow, and locust trees more often; children in the south see plane trees, camphor trees, and osmanthus trees more often. The natural climate also provides learning materials. Children living in coastal areas are more likely to experience typhoons, and children living inland are more likely to feel the pain of drought. In the community, children can directly experience the feelings brought by the change of the four seasons of natural objects, including the vitality of all things in spring, the colorful flowers in summer, the fragrance of sweet-scented osmanthus and ginkgo leaves in autumn, and the cold wind and rain in winter. Snow is flying.

4.1.2. Natural Resources Provide a Source of Mental Development for Children.
The Soviet educator Suhomlinsky pointed out affectionately: If children want to get training in thinking, they have to travel to nature. In nature, children's minds become active, and they perceive both the obvious interconnections between phenomena in the world around them, as well as those that are not immediately apparent. Gradually, this initial concept of living and nonliving things is formed in the child's consciousness. Some things are living things, and other things are nonliving things - this is something children can see through a lot of facts. In the process, things in nature become the source of children's thinking development. Children see and experience nature with their own eyes, constantly pay attention to and think about natural objects, and explore causal connections, and the original concrete visualization thinking gradually
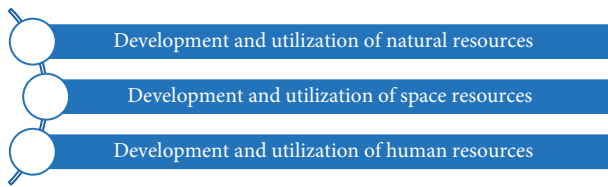
FIGURE 5: Strategies for the development and utilization of educational resources for children in the community.

develops into abstract logical thinking. All-natural objects in the community can become a stream of distinct objects, perceptions, and representations flowing into the hearts of children's thinking, thus forming a certain impact on the children's mental health.

4.2. Development and Utilization of Space Resources. The community is an important place in children's life. Each community contains basic venues and various institutional facilities. These spaces can also be constructed as children's learning fields.

4.2.1. Community Public Spaces Provide Opportunities for Children to Exercise and Communicate. Public spaces are standard in every community, but there are large and small differences. With the development, a lot of space is occupied by private people, and there is less and less public space. Sometimes someone takes the space privately because it is also money, and sometimes it is a fringe, no identity, full of parked vehicles, trash cans, or signage. The way spaces were used in the past had to be changed and given quality and value to them. A good community should have public spaces where children can move freely. Public spaces need to be safe, spacious, open, and accessible. Many separate areas can be set up in the public area to meet children's sports interests, such as a water play area, sand play area, sports area, and equipment for children's sports can also be added in the corresponding areas. Children play to their heart's content in public areas to achieve full physical movement. At the same time, children get to know a wide range of members of the community in public places and gain social development through communication with them.

4.2.2. Public Service Agencies in the Community Provide Opportunities for Children's Social Cognition. These public service agencies provide services to each family and provide children with opportunities for social awareness through formal and informal means, as shown in Table 3. These institutions serve as educational bases for children and can arrange specialized staff to give professional demonstrations and guidance to children. Studies have shown that children who are able to go to zoos, parks, museums, libraries, and corporate buildings perform better in various school subjects than children who do not have the opportunity. In these public service institutions, children also gain specific perceptions of the social roles and behaviors of institutional staff, laying an empirical foundation for them to understand

TABLE 3: Rich types of community public service institutions.

Specialized educational institutions	Kindergartens, schools, libraries, museums, etc.
Specialized medical institutions	Hospitals, clinics, etc.
Specialized commercial institutions	Supermarkets, shopping malls, pharmacies, flower shops, beauty shops, etc.
Special transportation places	Railway stations, bus stations, airports, etc.
Specialized entertainment venues	Opera houses, cinemas, etc.
Specialized occupational places	Police station, fire station, community service center, etc.

and adapt to society. For example, the police can educate children about safety and guide them to protect themselves; police can put on uniforms to show their working status and tools, teach children how to contact the police in time when they are in danger, and teach children how to cooperate when police help is needed. When children go shopping in the supermarket, children can gain rich mathematical experience, including specific experiences, such as item type, quantity, size, production date, etc.

4.3. Development and Utilization of Human Resources. According to the point of view of symbolic interaction theory, the interaction between people is based on the interaction of symbols, and the symbol is the mediator of the interaction. Human behavior is meaningful, and to understand a behavior, we must make a concrete explanation of the meaning that the actor assigns to his behavior. The inspiration given to us by this point of view is that we should pay full attention to the mediating role of symbols, use symbols appropriately, and at the same time listen to the interpretation of the symbols by the behavior sender and understand the meaning of the other party's behavior. All of this needs to be realized in interaction. Children understand the value and meaning of symbols in their interaction with others and enhance their own social experience.

4.3.1. Children Gain Social Experience in Their Interactions with Adults. Children's interactions with adults in the community affect children's development because children learn a range of different social patterns and gain different experiences in the process of interacting with adults.

(1) Professional Educators Provide Professional Education Guidance. Every community has various types of educational institutions, and teachers in educational institutions are professional educators. They can play a more active role in educating children. On the one hand, professional educators can provide advice and suggestions for community children's education; on the other hand, professional educators can provide educational services for community children in their spare time. Professional educators can provide advice to parents, solve troubles for children, and

organize rich activities for children to build a platform for children to grow. Professional educators' community service can be incorporated into their work performance, gaining practical experience in education and recognition at work. Professional educators actively participate in community children's education, which will promote the common growth of children, parents, and professional educators themselves. For example, the Sihuan Game Team, founded by graduate students of Beijing Normal University in a vegetable market in Beijing, has achieved good social and professional growth effects.

(2) People in Various Industries Provide Vocational and Labor Education. Community people are widely distributed in all walks of life, and the work experience of people from all walks of life can be a source of learning for children in the community. People from all walks of life have their own expertise, and they can use their expertise to contribute to the education of children in the community. For example, doctors can educate and guide children in the common sense of medical and healthcare; lawyers can publicize children's knowledge of the law, abide by the law, understand the law, and use it; sports workers can form sports teams to lead children in professional sports, etc. The community can recruit volunteers to mobilize the power of people from all walks of life and form various learning and sports groups to promote children's development. In contact with people in various industries, children learn about relevant occupational roles and behaviors and carry out observational learning. The daily operation of life requires the labor of people from all walks of life to maintain. Children in all walks of life can directly feel the importance and glory of labor and then gradually develop a love for labor and respect for the fruits of labor. Children gain a perceptual understanding of occupations from their interactions with people in various industries, gradually clarify their career choices, and lay a preliminary experience for future development and employment.

4.3.2. Children Develop Social Behaviors in Interactions with Peers. Children are naturally gregarious, and they cannot grow without interaction with their peers. Peer groups will provide children with early experiences of social interaction and cooperation and promote their social development. In the case of limited resources, children and peers will compete, such as competing for venues, equipment, and partners. But more often, there is a cooperative relationship between children and their peers. They cooperate in games and sports, learn to adapt to each other under the rules of turns and exchanges and gain social interaction experience. There is an equal dialogue relationship between children and their peers. They support each other, help each other, learn from each other, share experiences and troubles, and achieve common growth. Friends are very important to every child in his childhood. When children become adults, they still cherish the friendship of their childhood peers, which has become a good memory of their spiritual world.

As Dewey said, "I regard the child's social life as the basis for the concentration or interconnection of all his training or growth. The social life gives him the unconscious unity and context of all his endeavors and his achievements." The community continues to provide them with experiential resources for physical, cognitive, aesthetic, emotional, and social development. Children perceive the world, develop themselves, and eventually grow into social individuals through the existing "cultural mirror." The community provides the natural foundation and cultural mirror for children's development and builds a broad platform for children's growth.

5. Conclusion

The community is the main place for children's growth and development. The development and utilization of community educational resources can help improve children's emotional experience, enhance children's understanding of nature and society, and promote children to develop good behavior habits and thinking awareness. Therefore, the community should attach importance to the development and utilization of children's educational resources and follow the principle of the subject, fit, and development.

This paper discusses the theoretical basis of the development and utilization of community children's education resources under the dual emission reduction policy, puts forward the corresponding development principles, and analyzes the main strategies to improve the efficiency of social education. First of all, starting from natural resources, guide children to observe nature, understand nature, and apply natural things to innovate and create. Secondly, the community should also strengthen the development and utilization of community space resources to create a good learning environment for children. In addition, the community should increase publicity, mobilize the strength of all sectors of society, and work together for the growth of children.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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Hindawi

Research Article

Self-Psychological Control and Creativity of Music Creation in Multimusic Environment

Caihong Xu [iD]

The Department of Music, Yuncheng University, Yuncheng, Shanxi, China

Correspondence should be addressed to Caihong Xu; zmm_12398@163.com

This study aimed to solve the difficulties in the research of self-psychology, three executive controls, and creativity in multimusic environment. In today's teaching and performance, the study of piano adaptation has practical significance in broadening artistic vision, improving performance technology, and training symphonic music thinking. A research method of self-psychological three executive controls and creativity generation for creation in multimusic environment is proposed. A computer composition algorithm is based on the hidden Markov model and interactive genetic algorithm. By integrating melody elements and rhythm into the traditional Markov model with only notes or rhythm as the unit, a new hidden Markov music prediction model is established, and the interactive genetic algorithm is used to optimize the music segments. Simulation results show that the algorithm can use a small dataset to quickly create music clips with certain melody logic and in line with users' personality. It is proved that the method based on the hidden Markov model and interactive genetic algorithm can meet the research needs of self-psychological three execution control and creativity generation in multimusic environment.

1. Introduction

The environment in which music is created is an important determinant and the diversity of environments allows for a wide range of possibilities. One of the most important influences is the natural environment, and through self-psychological control, it can help save carbon emissions in the process of creating music, while creating music that conveys a desire for the beauty of the natural environment and causes more people to be aware of the need to protect it.

In the vast number of piano music works, there are always some differences in the value judgment of adapted music. The so-called piano adaptation is adapted from other forms of music works and transformed into piano works through keyboard music thinking. In the history of music, the number of piano adaptations is extremely large. Whether out of artistic interest or practical needs, this music form has continued since the birth of the piano, especially in the romantic period. On the other hand, because the adaptation cannot be completely separated from the influence of the original and there are some rough adaptation works, the

creation form of piano adaptation has objections in the evaluation of artistic independence and artistic quality. However, from the perspective of the development of macromusic history and the current situation of piano performance and teaching, piano adaptation still has irreplaceable significance. This study focuses on the excellent piano adaptation in the history of music, discusses its historical factors and artistic characteristics, and extends it to the current development context of piano music in China, trying to further clarify the practical significance of piano adaptation in performance and teaching [1]. However, in teaching of piano performance, the induction of theory, technology, and practice is also very important, as shown in Figure 1.

In the context of international culture, in order to improve the quality and innovation capacity of all cultures, it is necessary to apply the concept of multicultural education, music, and support music education in our country. The significance of this concept is as follows: (1) meet the current needs of economic globalization and cultural diversity. At present, people have entered the information age. There are
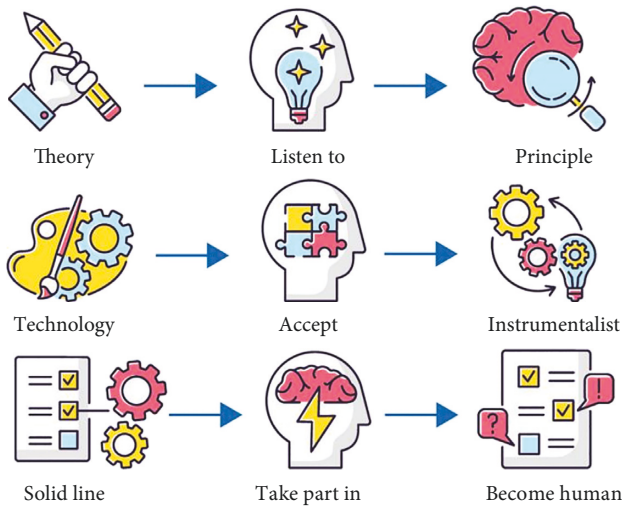
Figure 1: Summary of theory, technology, and practice.

Figure 2: Multicultural music flowchart.

frequent exchanges and collisions between various cultures. Cultural diversity has become a key consensus in the world. Based on this, actively promoting the progress of the multicultural education model is to comply with the pace of the progress of the times. At the same time, carrying out multicultural education in college education activities can promote students to look at the music culture of each region and each nation with a broader vision, promote mutual reference and learning among all ethnic groups to a great extent, and strengthen cooperation and exchange among all ethnic groups [2]. (2) It is conducive to improving national quality and promoting the construction of a civilized and powerful country and a harmonious society. Music education is an important form of cultural education, which can improve the comprehensive quality and cultural soft power of the people. By further carrying out multicultural music education, it can comprehensively promote the process of social harmonious development composed of people from various cultural backgrounds, which is conducive to the revitalization of the country and the nation. (3) It is conducive to the reform and innovation of music education, the active implementation of multicultural music education, and the use and excavation of China's long-standing and profound national music culture to a great extent, which can break the pattern of Western music Monism and make China's music education more diversified in content and form [3], as shown in Figure 2.

2. Literature Review

Multicultural music education is as much a concept as multicultural education. Many experts, scholars, and researchers explain this based on their research. Lim, the founder of the concept of music education, understands the changing nature of diversity in a variety of music genres around the world. The difference in music is due to the presence of music in the culture. Cultural differences determine the diversity of music, and the study of music depends on the diversity of music, which inevitably reflects
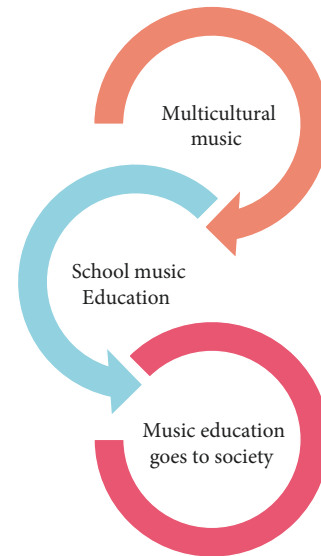
the diversity of characteristics [4]. The multicultural music education has been recognized as a form of music science and music planning. He believes this is a model of multicultural music education. Zheng, vice president of the China' World Music Association, defines that the concept of multicultural music education is a multicultural, multicultural culture that reflects the history of people and music education and the development of one another. Therefore, music education should dismantle Western music, especially European music, and embrace all the world music and culture. First of all, we must acknowledge and adhere to the culture of different cultures of all races and use the music and culture exchange and discussion of the countries [5].

In short, multicultural music education, as a multicultural education sector, seeks to promote the richness and diversity of music education and to develop diversity and a round to equal music education for all cultures around the world, the success of the heterogeneity of music culture. Specialized study topics include Western music, modern star music, Western music, and non-Western music. It is a standard pan-cultural music education that includes all aspects of music culture from ancient times to the present. The goal is to expand students' esthetic perceptions by learning a variety of music, increasing understanding and respect for different cultures, helping students set up music standards, and make students face more of the challenges of globalization in the future.

In music creation, adaptation has existed since ancient times. According to the literature, organ adaptation has appeared since the 14th century, and the adaptation phenomenon in the composer's creation is also very common in the Baroque period and the classical period. However, different from the romantic period, the early keyboard music adaptation is more out of the composer's creative will. It is a type of music genre, and it also realizes the reference and learning of others' creations through adaptation. Bianco has made achievements in the adaptation of his own works and the creation of others, which not only shows his artistic

interest but also shows the artistic commonality of Baroque music for future generations [6]. Kengerli-Najafova, the early seven piano concertos were all adapted from the creations of others. For example, the three piano concertos numbered k.107 came from his three piano sonatas [7]. It should be said that Mozart benefited a lot from this kind of adaptation in his early artistic growth. Choi adapted his own chamber music works, even though he seldom adapted other people's music works and also adapted violin concerto in D major (Op.61) into the piano concerto version [8]. The romantic period reached the peak of the development of piano adaptation. Bishop and others have left piano adapted works more or less, including famous songs [9]. Among all composers involved in the field of piano adaptation, Liszt's achievements are unmatched. He not only created a large number of piano-adapted repertoires but also brought the technical difficulty and artistic quality in this field to an unprecedented level and also had a far-reaching impact on the subsequent composers' creations.

Under the influence of Voskoboinikov, later composers also continued to explore the road of piano adaptation [10]. By the 20th century, the difficulty of piano adaptation was more challenging, and the path and purpose of adaptation were gradually diversified. Most importantly, the adapted music created for teaching and training has become a new creative direction. Campayo Munoz succeeded Liszt in his prominent position as a leader in the field of piano adaptation. His adaptation achievements are also famous for their large number, wide types, and fine technology [11]. Bugos in addition to the adaptation of Bach's violin and cello works, the adaptation of Chopin etude and waltz is more applied in piano teaching [12]. Park adapted Rimsky–Korsakov's "wild bees flying" as a household name [13]. Mosorsky's "picture exhibition" adapted by Bondarenko is also a common track in today's concert [14]. Pianists Radzetskaya and others also set foot in piano adaptation, adding many wonderful chapters to the piano players' repertoire selection [15]. In today's music environment, piano adaptation has gone deep into every corner of piano learning and performance. From professional piano teaching to popular piano music loved by amateurs, adaptation and creation can be said to be everywhere. Only from the perspective of the scope of professional teaching, the large number of works and repertoires left by predecessors are enough to make us think about the practical significance and teaching value of piano adaptation.

3. Methods

The algorithmic compilation, or automated compilation, is a set of rules designed to make a variety of music an organic whole in accordance with certain rules. Algorithm design does not have to be computer [16]. In the classical era, a combination of different music modules was created at random to create a "music cube game" with good results.

3.1. Design of the Music Creation Model Based on Hidden Markov. The traditional Markov chain composition method

is based on the Markov model. Usually learn a certain amount of music and build a Markov model with note or rhythm as the state space. However, for music, rhythm and melody (pitch fluctuation, i.e., melody) are the two most important elements in music, and they are an inseparable whole. In order to simplify the calculation, only one or a few music elements are usually considered in the algorithm research. However, the current research usually separates the musical elements considered, such as modeling the rhythm and melody separately, which obviously does not meet the needs of music creation. This article will improve this. The hidden Markov model is used to describe the relationship between rhythm and melody of music, and the two are created as related factors, as shown in Figure 3.

HMM is a statistical model of time. It is often used to describe the Markov process that is not clear. Markov procedures are always visible to the observer. The result of global change is all the characteristics of the model. In the HMM, the state is not directly visible, but some changes affecting the state are observed [17]. Because each state has a result of the distribution of possible release codes, the sequence of release signals can present some information about the state temporarily. Therefore, HMM has two result matrixes, the state manifestation matrix and the transmitted disease matrix corresponding to the behavior formed or received when the state changes. An HMM consists of the following five components:

The implied status is

$$X = \{x_1, x_2, \ldots, x_n\}, \tag{1}$$

where n represents the number of all possible states.

The set of observation symbols is

$$Y = \{y_1, y_2, \ldots, y_m\}, \tag{2}$$

where m represents the number of possible observation symbols corresponding to each state.

The state transition matrix is

$$A = \{a_{ij}\}, \tag{3}$$

where

$$a_{ij} = p\left(q_{t+1} = x_j | q_t = x_i\right), \quad 1 \le i, \, j \le n, \tag{4}$$

where q_t represents the state at time t.

The emission matrix, the observation probability matrix, is

$$B = \{b_i(k)\}, \quad 1 \le k \le m, \, 1 \le i \le n, \tag{5}$$

where

$$b_i(k) = p\left(o_t = y_t | q_t = x_i\right), \tag{6}$$

where o_t represents the observed value in the state of x_i at time t.

The initial state is

$$\pi = \{\pi_i\}, \quad 1 \le i \le n, \tag{7}$$

where
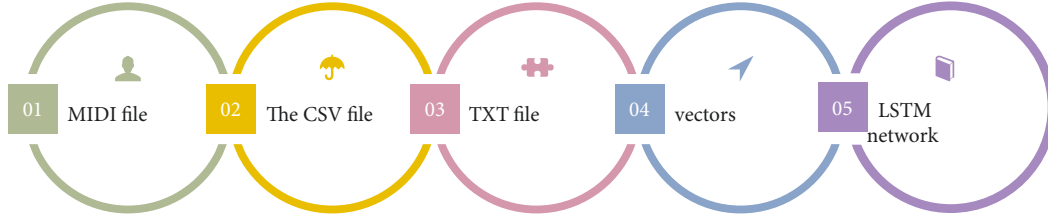
FIGURE 3: Creation flowchart.

$$\pi = p(q_1 = s_i). \qquad (8)$$

A simple HMM state transition is shown in Figure 4

Thus, the HMM model can describe the process of transition from a known state to a latent state. In other words, when the sequence analysis $O = o1, o2, \ldots, ot$ know when the model is unknown, the probability of the state $Q = q1, q2, \ldots, qt$ is choice. This is the decryption problem in HMM. In this sentence, we use the Viterbi algorithm to solve this.

The Viterbi algorithm is a dynamic programming algorithm. It is often used to determine the hidden Markov model to find out the most likely occurrence in state systems that visualize state events as the state is aware of.

Assuming that the state space is X, the probability of the initial state x_i is i, the state transition probability matrix is A, the emission probability matrix is B, and the observed outputs are $o1, o2, \ldots, ot$, and the most likely state sequences $q1, q2, \ldots, qt$ that produce the observation results can be recursively obtained by the following formulae:

$$V_{1,x_i} = P(o_1|x_i) \cdot \pi_i, \qquad (9)$$

$$V_{t,x_i} = P(o_t|x_i) \cdot \max_{x_j \in X}\left(a_{j,k} \cdot V_{t-1,x_j}\right). \qquad (10)$$

Formula (10) is the result of the sequence of states corresponding to the result of the first t analysis with the last state x_i. The Viterbi method can be obtained by resetting the indicator and alerting the state in a vault (10). In addition, the function Ptr (x_i, t) is used to refer to x_i for the calculation of $t > 1$ or $t = 1$. Therefore, it is shown as

$$\begin{cases} x_t = \text{argmax}_{x_j \in X}\left(V_{t,x_j}\right) \\ x_{t-1} = Ptr(x_t, t) \end{cases}. \qquad (11)$$

Then, according to the Viterbi algorithm, we can use the known observation state of the system to infer the most likely hidden state.

Rhythm is the skeleton of music. Although the music fluctuates and sounds are elegant, the music can be chaotic if there is no good rhythm in the background. HMM provides a great solution for connecting music and rthyme. In this form, rhyme is considered to be the underlying state of HMM, and music is the latent state in HMM. First, create an assembly and then create a new system of music using the Viterbi algorithm based on this analysis. In previous research by Markov simple concepts, most of them used a form or writing term as a placeholder for states of random
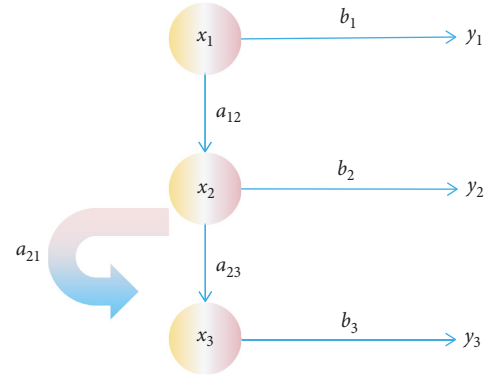
FIGURE 4: HMM state transition diagram.

processes. For example, the frequency of the next state of each record is considered to be the probability that the current state will move to the next state [18]. This method can only affect the surface structure of the training samples. In order to develop a deeper model, we need to create a more robust Markov chain, which will increase the complexity of the algorithm, and in most cases, the gain will not be lost. In this case, the function extracts information from the data and adds an understanding of the meaning of the music to improve the perception of HMM in the music, as shown in Figures 5–8.

In order to mine the internal structure of music knowledge to the greatest extent on the premise of first-order HMM, this study adopts the learning method of melody element and single note. The melody element construction based on music rules is more similar to the creation mode based on a knowledge base system and music grammar, which will limit the structure of melody elements to a certain extent, and this study has proposed that it is very difficult to build a complete and effective music rule system. In this way, the melody element generation system based on music rules will produce many melody elements that do not meet the requirements. In Karsten Verbeurgt's method, melody elements are extracted based on the dictionary tree query principle, but the length of melody elements is not limited, which will lead to several sections of the learning sample being defined as one melody element at the same time, which sets a great obstacle to the creativity of music creation [19]. Therefore, in this study, the melody element is defined as follows: the music segment that appears more than twice in a piece of music and is between 2 and 5 notes in length is the melody element. The dictionary tree will not be described in detail in this article. We will give an example to
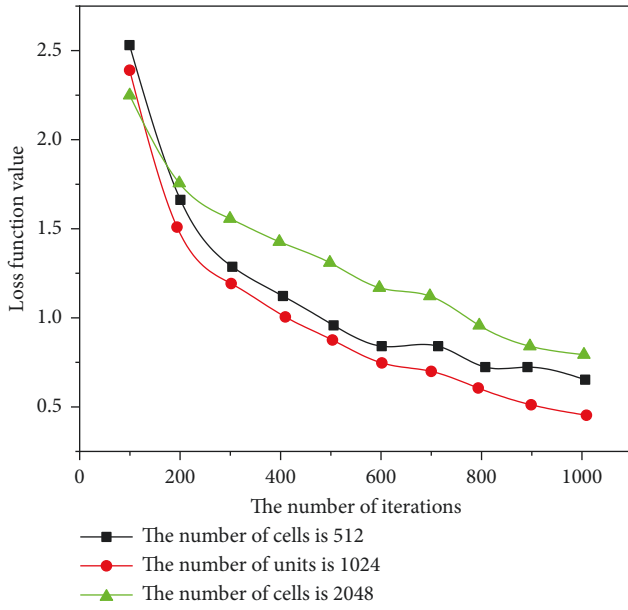
FIGURE 5: Comparison of loss function values of different LSTM units.

FIGURE 7: Comparison of loss function values of different scales.
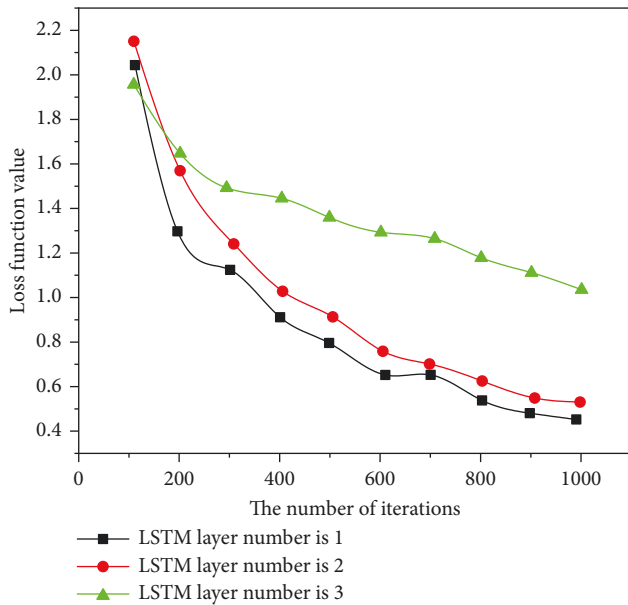
FIGURE 6: Comparison of loss function values of different LSTM layers.
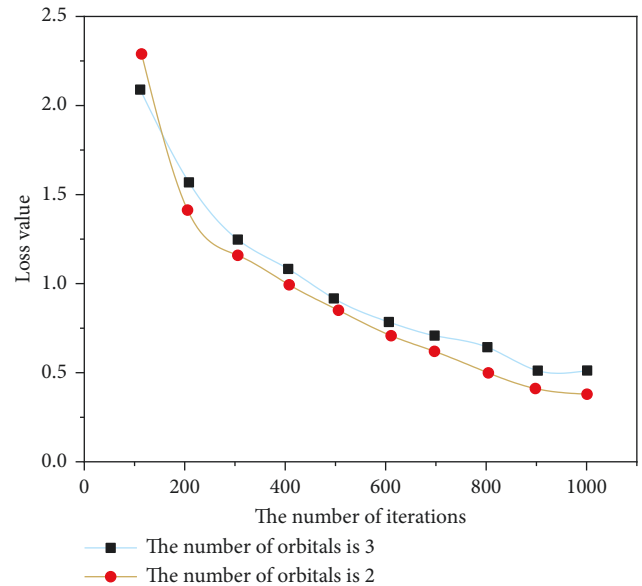
FIGURE 8: Comparison of loss function values of different track numbers.

introduce how to extract the melody elements in the music clips to be learned according to the dictionary tree search principle. First, we treat all the occurrence positions of each note as a root node and query downward until all branches of a root node have different notes. For example, the code of a piece of music is "ABCABCDE." The search tree constructed according to this music is shown in Figure 9.

There are three small fragments that have appeared more than twice, ABC, BC, and C. However, the music segment with more than two occurrences and a length between 3 and 5 notes only has ABC. Therefore, according to the definition of melody element in this study, the melody element is ABC.

Through this method, all qualified melody elements in a series of music to be learned can be extracted. When training the transition probability parameter matrix of HMM, melody elements and single notes are fused together to form a state space describing the multilayer structure of music, which makes up for the problem of probability combination between notes that can only describe the surface of music in the first-order Markov [20].

In conclusion, it can be determined that the music you are going to study in the hidden state of HMM has a record and the music is deleted. By definition, the music of music education is a state of observation. The following three parameters need to be defined: state change probability
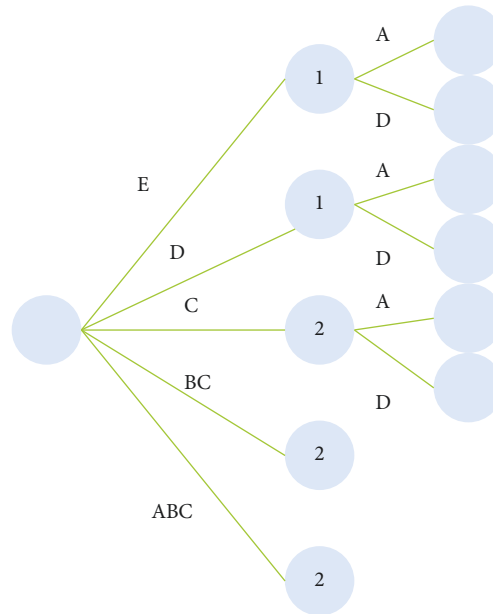
FIGURE 9: Melody meta-search tree constructed according to "ABCABCDE."

matrix, launch probability matrix, and primary probability matrix. Once we have identified the hidden state of the model, we can calculate the hours of each region in the music segment we need to study. Each state has the ability after the state (warning or travel time), and the frequency of these states is considered to be the resulting matrix for the change of states, as reported in the following equation:

$$a_{ij} = \frac{N(q_j|q_i)}{\sum_{k=1}^{n} N(q_k|q_i)}, \tag{12}$$

where $1 \leq j \leq n$, n is the number of each state obtained after the current q_i state. N (qk | qi) is the number of next qk states of the current q_i state. For some states, the probability of a change is considered zero unless there are other states. For example, in "ABCABCDE," state "A" does not jump to "D." Then, the result of moving from state "A" to state "D" is defined by zero.

The initial probability matrix is the result of the latent state to the visible state. We interpret the data according to the latent state, and the relative time for the data is the state analyst. The probability matrix then counts the total time values of the notes in the music study and their frequency. The formula is the same as the state transition matrix result as shown in the following equation:

$$b_{ij} = \frac{N(o_j|q_i)}{\sum_{k=1}^{n} N(o_k|q_i)}. \tag{13}$$

The first state distribution determines the initial state of the model. This information counts the location and number of first points of all text in each music section to be studied. The first result of the recording is given in the following equation.

$$\pi_i = \frac{N(q_i) + 1/\text{index}(q_{i,1})}{\sum_{j=1}^{n} N(q_j) + \sum_{j=1}^{n} 1/\text{index}(q_{j,1})}. \tag{14}$$

Here, $1 \leq i \leq n$, n is the size of the state model, and $N(q_i)$ is the number of events of the state q_i in the training model. Imolex (q_i) is the state function that first appeared during the training sample package. The initial probability of a given state is proportional not only to its frequency in the sample set but also to its position in a given text. It can reflect the rule of this state in this sample set.

Because the surface structure of the music is important, it often indicates time and security. Thus, these data initiate the first Markov chain decision of the state analysis of the model [21]. The time interval in the set structure is taken to be the local state, and the frequency of the resulting states is calculated from the occurrence of the initial distribution and the transition state matrix (12). To simplify the algorithm, the length of the system type created by the model is limited to 50. The flow diagram of the composite system as HMM is shown in Figure 10.

3.2. Interactive Genetic Algorithm Optimization Model. Theoretically, the HMM-based design algorithm proposed in this article can produce music similar to training models, but music is a commercial product that has good wishes. Different people may have different opinions about songs of the same genre. Therefore, it is important to consider how the music composing algorithm can create a sound that meets the needs of the users [22]. To solve this problem, this sentence uses an interactive genetic algorithm. On the other hand, the crossover operator of the genetic algorithm retains the excellent performance in the music production equipment, and the exchange operator can not only learn from the performance but also changes the music like the creative attitude of the composer who gives it all, playing with their inspiration in acting. On the other hand, an interactive genetic algorithm uses measurement tools, which allow the evolution of music to suit the user's needs and thus to the user's needs. Music encoding uses MIDI encoding numbers.
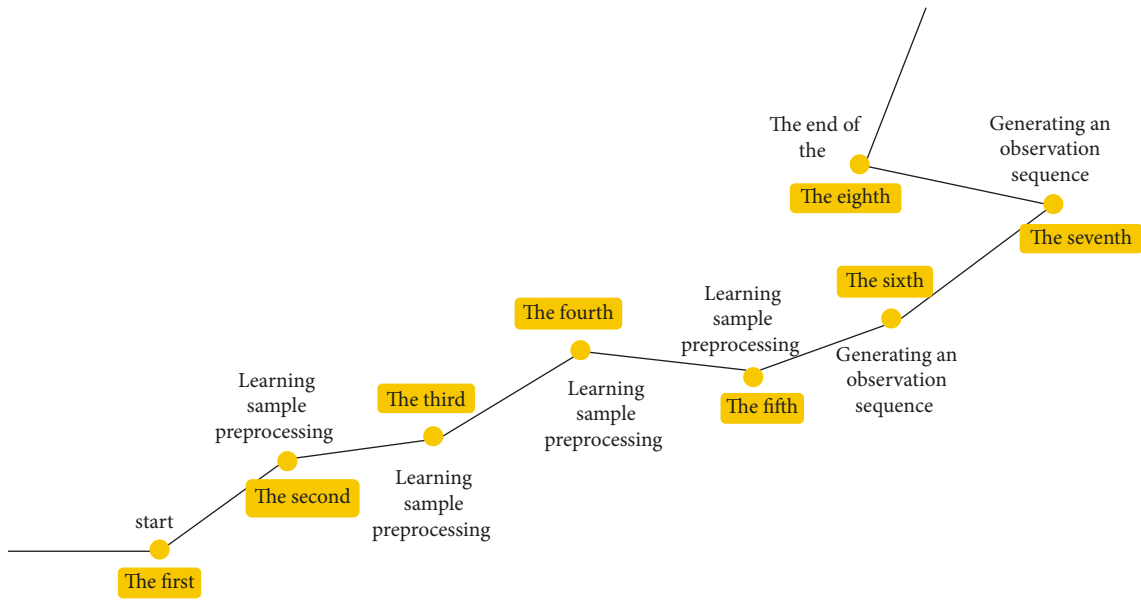
FIGURE 10: Flowchart of the composition algorithm based on HMM.
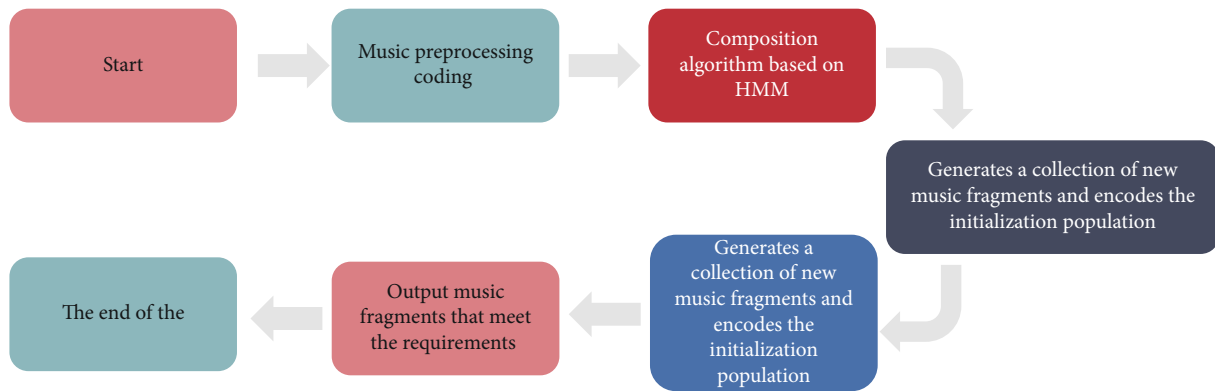
FIGURE 11: Computer composition algorithm based on HMM-IGA.

Considering the training examples selected in this article, atherosclerosis coding is limited to thirty-six sheets for all studies [23]. The time of the entire map is defined in the first unit, and the audio encoding is [1/32, 1/16, 1/8, 1/4, 1/2, 1]. The music is finally encoded into the matrix, as reported in the following equation:

$$chrom = \begin{bmatrix} 58 & 60 & 61 & 62 \\ 0.5 & 0.25 & 0.25 & 0.5 \end{bmatrix}. \tag{15}$$

The pitch of the first behavior and the rhythm value of the second behavior.

Select operator and operator crossover as a roulette option and multiple themes crossover. The following three exchange rates are used by exchange staff:

(1) A segment of pitch in a chromosome increases or decreases n steps at the same time, and the variation range of n is set as [1, 2, 3], as shown in the following formula:

$$chrom\_mu = chrom \pm \begin{bmatrix} n & n & n & n \\ 0 & 0 & 0 & 0 \end{bmatrix}. \tag{16}$$

(2) A rhythm in a chromosome increases or decreases K beats at the same time, and the value range of K is [0.25, 1, 1.5, 2], as shown in the following formula:

$$chrom = chrom \pm \begin{bmatrix} 0 & 0 & 0 & 0 \\ k & k & k & k \end{bmatrix}. \tag{17}$$

(3) Single point random mutation:

When there is a change, if the notice or value match exceeds the limit, it will randomly move to the state in its respective state.

This phrase is used to measure the book to provide exercise value to the music and to be the leader of the improvement. To reduce the hearing of users during the evolution of the algorithm, the physical value of a person is
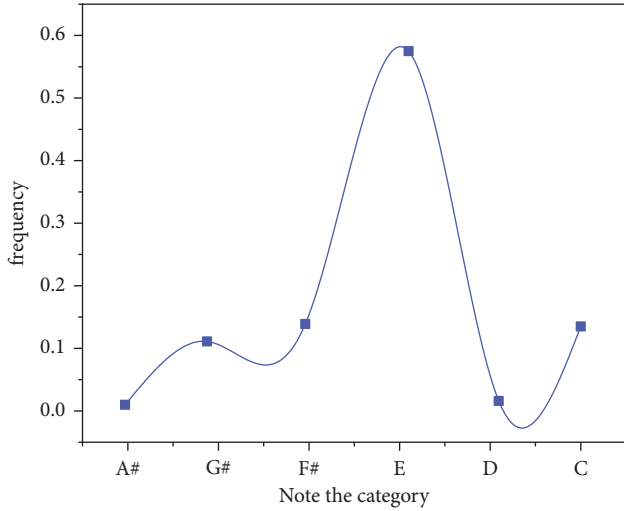
FIGURE 12: The number of iterations is 200.

FIGURE 13: The number of iterations is 400.
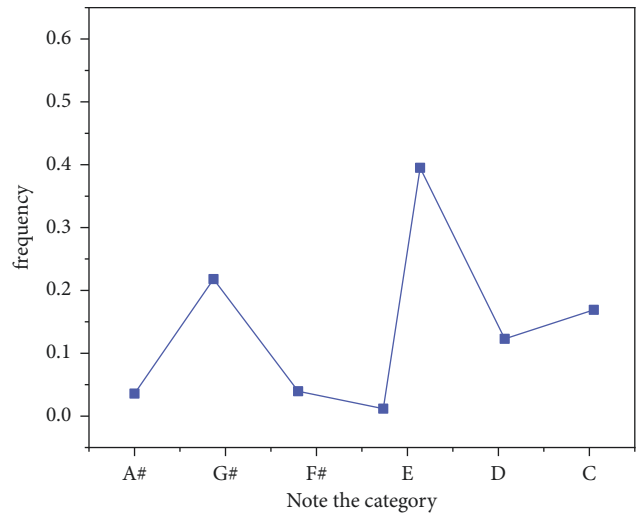
FIGURE 14: The number of iterations is 600.

determined by weight of book analysis and similar according to the morphological characteristics of the music, as shown in the following equation.

$$Fit(i) = w \cdot H(i) + (1 - w) \cdot S(i). \tag{18}$$

Among them, $H(i)$ and $S(i)$ are the normalized manual evaluation value and similarity based on music morphological features, respectively, and w is the weight of connecting the two parts of fitness. The value rule is shown in the following formula:

$$w = \begin{cases} 1, & n = \lambda \cdot k - \dfrac{k \cdot (k-1)}{2} \cdot \beta, n > 100, \lambda - k \cdot \beta \geq 0, \\ 0, & \text{else}, \end{cases} \tag{19}$$

where n is the evolutionary algebra, $k \epsilon\ N$, N is a natural number, and β and λ are the positive integers. In this study, 20 and 4 are taken, respectively. This can ensure that the artificial evaluation can completely dominate the evolution direction with the evolution algebra.

Similar pitch and rhythm can express similar hearing. The fitness when w is 1 is given by the user. When w is 0, using the morphological characteristics of the optimal individual to measure the advantages and disadvantages of population evolution can also achieve the purpose of guiding evolution in the direction of user needs [24]. In this study, the morphological characteristics of note sequence are symbolized, and rising, stationary, and falling are mapped as [1, 0, −1], respectively. Then, the fitness function of the individual is calculated by using the similarity of morphological features, as shown in the following formula:

$$S(i) = \sum_{j=1}^{l-1} \sqrt{(SPop(i,j) - Sbest(j))^2}, \tag{20}$$

where l is the length of the individual, and SPop and Sbest are the symbolized population and the best individual, respectively.

Through fitness formula (18), the termination condition of the algorithm is to reach the maximum evolutionary algebra or user satisfaction. To sum up, the flowchart of the composition algorithm based on HMM and IGA proposed in this study is shown in Figure 11.

4. Experimental Results and Discussion

This article describes the simulation method based on MATLAB. Example training: classical piano performance. The parameters algorithm is developed as follows: The length of the design work is 50 notes. The length of the text is obtained from the dictionary looking for trees [2,5]. The magnitude of the IGA population is 10, the maximum evolutionary algebra is 50, the crossover probability is 0.8, and the correlation probability is 0.2. Equation (19) λ is 20, β is 4, and formula (16) has a range of N oscillations [1–3]. The average in equation (19) is 4 because of 20, so the simulation yields 4 false positives. Each column represents the physical
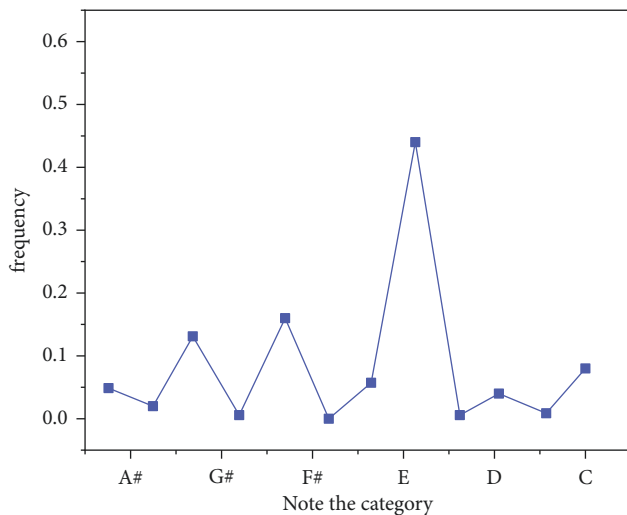
FIGURE 15: The number of iterations is 1000.
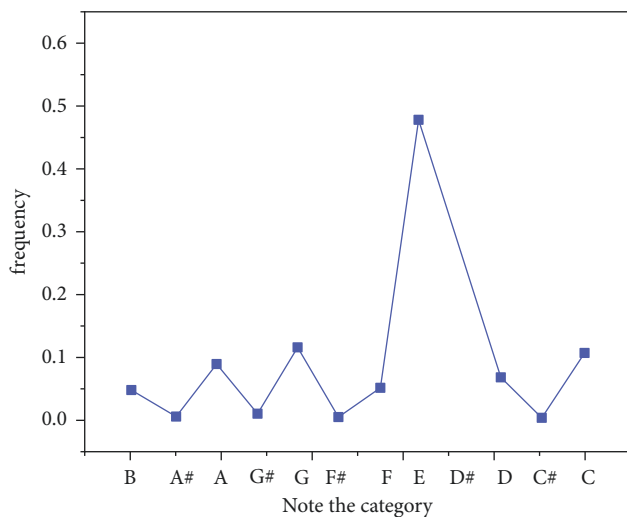
FIGURE 16: Note category frequency diagram.

values of the four false tests in a simulation. With the exception of four simulations, it can be seen that the algorithm can achieve sufficient results, as shown in Figures 12–15.

Compared to Markov's compositional algorithm, this algorithm not only considers the possibility of isolating notes and rhythms but also combines notes and rhythms, elements of the movement, and the mapping between rhythms with elements of the movement. The creations are more coherent, adaptive, and have a sense of rhythm. Compared to other popular neural network-based algorithms, this algorithm has advantages such as fast learning speed, small samples, and human-computer interactions [25], as shown in Figure 16.

Piano adaptation is a link that cannot be ignored in the field of piano art. This form of music creation integrates social change, class change, and artistic trends. Digging deeply into the theory, the piano adaptation reflects a kind of extreme pursuit that evolved from the development of Western classical music in the 19th century; while observing

from the practical application, this phenomenon is related to the popularization aesthetics of mass entertainment. Based on its remarkable achievements in the history of music development and its application in today's performance and teaching, the importance of piano adaptation is self-evident. To sum up, piano adaptation has played a positive role in the development of piano art. Although its esthetic taste has two-sided characteristics, it cannot erase the historical and artistic value of such works. The development path of Chinese piano adaptation is different from that of the West, but they all provide wonderful artistic chapters for piano players. The selection of excellent piano adaptation is helpful to improve the player's vision and skills, to enrich artistic expression, and has a practical significance in teaching and performance practice.

5. Conclusion

This line presents an interesting way to research to become our leader in psychiatry and creativity in various fields of music. The simulation results show that the new computer-based functionality based on the hidden Markov model and the interactive genetic algorithms mentioned in this article can be used to create cohesive working groups, such as model training and guiding the evolution of development. The next step is to develop an algorithm tailored to the needs of the users and ultimately to create activities that satisfy the customer. The algorithm is less complicated and requires less examples of training. I believe that in the age of information and knowledge of the future, we will explore our mental performance of control and creativity of ourselves using Markov's secret model and interactive genetic algorithms in a variety of music environments.

Data Availability

The dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

Progress and Prospects of Research on Public Services in Sports in China: Analysis in the Context of Bibliometric Ecological Civilization and Social Networks

Xiang Zhong,[1] Chao Jiang [iD],[2,3] Li Li,[1] and Haikui Zhou[1,3]

[1]*School of Physical Education, Chaohu University, Hefei 238024, China*
[2]*School of Economics and Law, Chaohu University, Hefei 238024, China*
[3]*Graduate School University of Perpetual Help System DALTA, Manila 1740, Philippines*

Correspondence should be addressed to Chao Jiang; 050092@chu.edu.cn

In order to better understand the current situation of Chinese public sports, this paper studies Chinese public sports. According to SATI3.2 statistics, 71 newsletters have published a total of 903 articles, of which 40 newsletters have one article, 19.7% of the newsletters have 2–9 books, and 17 magazines have more than 10 issues. The results show that by measuring data, we can better understand the current state of China's public services. This paper uses the method of bibliometric analysis to sort out and summarize the policies, characteristics, hotspots, and trends of China's public service field under the social network environment. The survey shows that the education sector has paid less for public entertainment in recent years. The research direction is system, equity, government procurement, interest, capital allocation, strategy, and supply chain. This paper highlights that the short-comings of public sports research in our country: "public sports services" and "public sports services" are not integrated; there are many macrostudies on public service sports but few microstudies; there is no track and field research for special public groups. This paper puts forward research guidance for China's public sports services and, at the same time, strengthens the research on public services of different products of rural sports development, strengthens the research on the intelligence of sports public services, and strengthens the research on the role of public sports. Governments at all levels support and strengthen research on public sports service standards, strengthen research on public sports performance measurement measures, and strengthen public sports balance research.

1. Introduction

Since the 18th National Congress of the Communist Party of China, the state's right to serve public services has been proclaimed one after another. Public sports have become an important part of the "Thirteenth Five-Year Plan," and public sports are increasingly popular [1]. The report of the 19th National Congress of the Communist Party of China pointed out that it is necessary to improve the level of public services, make people's lives easier, meet the needs of modern development, and seek a better life. In other words, building a perfect sports public service is not only one of the necessary conditions for people to live a better life, but also the inevitable condition for building a well-off society in an all-round way. At the same time, the report of the 19th National Congress of the Communist Party of China clearly put forward the development of sportsmanship. The power of athletics is related to public sports. Some scholars believe that improving the level of public sports is the only way to enhance sports strength [2]. Therefore, it is necessary to study public sports in China, which has played an important role in promoting sports. Based on this, from the perspective of bibliometrics, this research adopts the method of relational analysis to identify the status quo, characteristics, and hotspots of scientific research, so as to provide access for the public to play and for future public sports [3].

Taking the CNKI database as the literature retrieval platform, the retrieval subject is "sports public service" or
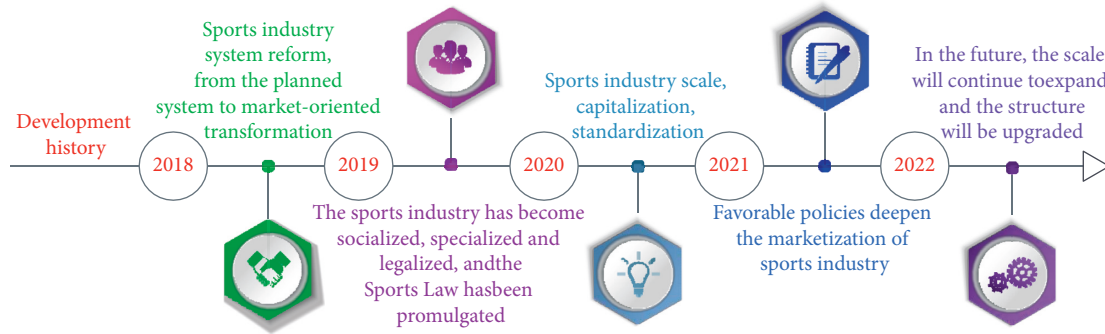
Figure 1: Development process of Chinese sports.

including "public sports service", the time is not limited, the source categories are "core journals" and "CSSCI", and 1104 titles are retrieved. Then we browse and read the title information, delete the meeting notice, speech content, and draft notice, and finally determine 903 valid sample documents. We use software such as SATI3.2, COOC1.7, data element, and Ucinet6 to sort out the data, draw the network structure diagram through the Netdraw function of ucinet6, reflect the research hotspots in this field, and master the main characteristics and laws of the research as a whole [4].

The sports industry is an industry involving the national economy and people's way of life. Encouraging everyone to participate in sports and improving the national physical quality has always been the focus of the government's work. In the new business environment, the sports industry and the sports industry have become important growth drivers. The development of China's sports industry has gone through several stages of development, as shown in Figure 1.

2. Literature Review

Xiao L. and others said that great achievements had been made in the research of sports public service, but there are still some deficiencies [5]. Wu D., through literature review, found that the concept expression of sports public service and public sports service is not unified [6]. Even in the same article, the two concepts are mixed. However, from the perspective of Chinese expression habits, sports is used as a modifier to modify public services, which means that public services are limited to the field of sports and can be distinguished from public services in other fields. Therefore, it is considered that the expression of "sports public service" is more accurate. Aman V. has a different understanding of the concept of sports public service due to different emphases, which can be roughly divided into two types: one is to emphasize the universality of sports service supply mode and the diversity of audiences from the perspective of "publicity" [7]. In order to meet the needs of public sports, the process of providing sports equipment to the public by different governments and institutions is a kind of sports service; secondly, from the perspective of "service," sports services are government functions. Al A. believes that public sports are a way of meeting the needs of the public and an essential service provided to the public. From the existing research, scientists have different interpretations of public sports due

to different viewpoints [8]. The existing research on sports public service is mostly qualitative research, the research results lack certain universality and operability, and the practical guiding significance is not strong. Kim I. g. generally tends to take the government as the leading role in the research on the supply mode, give play to the role of sports intermediary organizations, and make a slow transition to marketization. Macroqualitative research can provide some useful references for the practice of sports public service, but it can not help the deficiency of sports public service system innovation [9]. In addition to macroscopic research, microscopic research also needs to be strengthened. At present, most of the research focuses on the development of sports public services in different regions, cities, and rural areas, and there are few studies on sports public services for multiple groups in the same region, and only a few studies have been heard. Improve the participation of migrant workers and migrants in community public services and sports. Kalman K. believes that people in the same area will have some similarities in their applications for public sports services. Using regions as research data, a broad range of policies to improve physical activity in the public service sector can be obtained. Courses are always carried out at different levels and modes, and in-depth thinking and experience are common and universal so as to provide ideas and applications for improving public physical exams. Therefore, it is necessary to strengthen the research on the size of public sports, which is in line with the reality of urban differences and culture in our country [10].

From a scientific point of view, scientists do more research on government sports programs and less on public needs. Currently, a number of studies have been carried out on the provision of sports services to the public from the perspective of public needs. Asmara, UA paid more attention to the research with the government as the main supplier, ignoring the research and development of public sports applications to public services [11]. Given the important role governments play in providing public sports services, exploring existing resources and providing these types of public sports services from a government perspective can promote the construction and improvement of sports public services to a certain extent. However, the object of sports public service supply is the public. Bekerom, P. said that if the investigation of public demand is not paid attention to, it is easy to lead to the inconsistency between the

TABLE 1: Economic benefit ratio of the 23rd–27th Olympic Games (unit: USD 100 million).

Session	Time	Economic benefit ratio
23	1984	1.55
24	1988	1.60
25	1992	1.00
26	1996	1.00
27	2000	1.83

TABLE 2: Number of articles published by core authors (top 15).

Number of documents issued	Number of documents issued	Number of documents issued
21	13	11
21	13	11
15	12	11
15	11	11
11	11	11
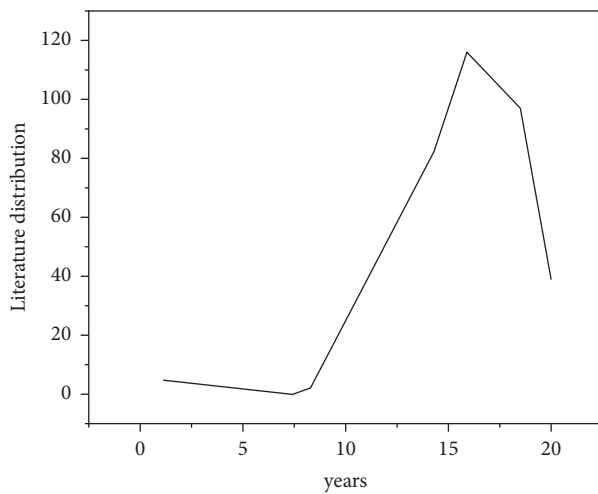
FIGURE 2: Annual distribution of literature in the field of sports public service research.

government's supply and the public's demand, which will lead to the fact that the government has done a lot of work in the supply of sports public services but failed to obtain the public's recognition [12].

The balance of public sports refers to the allocation of sports resources to meet the needs of the public for sports activities. Tan Zhongwei conducted in-depth research on the balance of public sports and believed that the government should play a good role in supervising and creating a good urban and rural environment, city and rural public service activities, and ultimately achieve a balance between urban and rural public service supply and demand [13]. At present, in the research of China's urban and rural public service equation, scientists often choose to study China's urban and rural urban public service equation through theoretical modeling, evaluation modeling, and measurement design. These studies provide a theoretical basis for the equalization of urban and rural sports public services in China. Achieving the balance of sports between urban and rural areas is not only the need to improve social cohesion but also the needs of the rural population for sports. Therefore, it is important to pay attention to the balance of urban and rural public services in the short term. Competitive sports, as a part of the entertainment sports industry and an indispensable part of the sports industry, are gradually recognized and sought after by experienced people. Olympic prowess and athletics have risen rapidly. In some developed countries in Europe and America, the sports industry, especially the competitive sports industry, has become an important part of the

national economy. In addition, by analyzing the market performance of the five Olympic Games (23, 24, 25, 26, and 27), some scholars believe that hosting the Olympic Games can create benefits for their country, as shown in Table 1.

3. Method

3.1. Analysis of Annual Document Volume. The annual distribution of paper output represents the historical context, present, and trend of this research field. As can be seen from Figure 2, the overall research on sports public service in China shows the characteristics of rapid development and fluctuation [14]. The project can be divided into three phases: the "research" phase, the "study" phase, and the "implement" phase, of which the "research" phase was started from 2007. By 2007, with the improvement of people's daily needs, my country gradually turned the focus of sports science research to the public, and the research began to focus on the analysis of the concept of public sports. The second is the rapid growth stage (2008–2015), the overall rapid growth. The sports public service system in the post-Olympic era has attracted extensive attention. In the period of fluctuating development (from 2016 to now), the literature output decreased significantly in 2016 and did not form a development trend of stable growth, reflecting the lack of sustained research and attention on sports public services in academic circles [15]. In the era of sports power, academia and society should pay attention to this field, as shown in Figure 2.

To understand the backbone of a field, it is generally necessary to explore the core authors in the field and understand them so as to grasp the development status and prospects of the field to a certain extent [16]. According to price's law formula: $N1 = 0.749 (N_{max})^{1/2}$, $N1$ is the number of papers published at least, N_{max} is the scholar with the highest number of papers published, and only the author who reaches $N1$ can be regarded as the core author. Among them, Wang Jiahong issued 21 articles, that is, $N_{max} = 21$, then $N1 = 3.4$. Therefore, authors with more than 4 articles in this field can be included in the core author group. According to statistics, there are 84 main authors with a total of 580 sentences, accounting for 64% of all publications published by the public service, with more than 50% policy value, indicating that the author is very important. The group was established in the field of Chinese public service sports research [17].

84 ∗ 84 core author co-occurrence matrix is generated through SATI3.2, and the network structure diagram of core author is generated by ucinet6 software. The core author cooperation network is a subnetwork formed by 84 core

authors sending documents alone or jointly. In other words, these core authors have great "power" in this field. They hold more resources in this field. They play an important role in resource sharing and information exchange. Generally speaking, it has a certain position or right in this field, which not only depends on the number of documents issued but also plays an important "intermediary" role in scientific research cooperation [18], as shown in Table 2.

Through the statistical software COOC1.7, the documents issued and cooperation of research institutions are statistically analyzed. From Table 3, it can be seen that 48 articles issued by a university occupy the first place, and a university is in the absolute core position in the field of sports public service research. For the cooperation of various institutions, select the institutions with more than 5 documents for visual analysis, finally generate 65 ∗ 65 cooccurrence matrix, and generate the cooperation relationship diagram by using ucinet6 software [19]. It reflects that the overall cooperation relationship is generally close, and a spider web prototype network structure chart with a university as an important node of cooperation has been preliminarily formed, which proves that the cooperation relationship between research institutions in this field is good. Through the statistical analysis of SATI3.2, it is found that 903 papers are distributed in 71 journals, including 40 journals with one article, 19.7% journals with 2–9 papers, and 17 journals with more than 10 papers. The citation frequency of papers is an important index to measure the research ability and paper level of scholars. The higher the citation frequency, the stronger the influence of papers and the higher the academic status and authority of scholars. The cited documents are mainly concentrated in the early 21st century, which is also closely related to the background of building a well-off society in an all-round way and building a socialist harmonious society. During this period, the structure, development, and thinking of the concept of public sports service were examined, which laid the foundation for perfecting thinking in this field. These letters are preceded by 547 letters. The title of this paper is the concept of sports serving the public, which reflects the hotspot of public sports research to a certain extent, as shown in Tables 3 and 4.

3.2. Selection of High-Frequency Keywords.

Keywords can reveal the research content characteristics, development context, and development trend of a certain field. Use COOC1.7 to extract the keywords, preliminarily process the keywords, delete the keywords that are of little significance to this study, such as "countermeasures," "current situation," and "path," and merge some keywords with similar significance, such as "public sports service" and "public service" into "sports public service," using the proposed high-frequency keywords, as shown in formula (1). That is, the first 47 keywords are high-frequency keywords, and the frequency of the 48th keyword and the 47th keyword is the same as 8. Therefore, the first 48 keywords are selected as the analysis sample [20], as shown in formula (1) and Table 5.

Table 3: Distribution of periodicals.

Periodical	Number of publications
Sports culture guide	107
Journal of physical education	51
Sports and science	49
Journal of a sports college	55

$$T = 47. \tag{1}$$

The 48 ∗ 48 cooccurrence matrix formed by 48 high-frequency keywords is processed, the network structure diagram is drawn by using ucinet6 software, and its network density and centrality are analyzed. After calculation, the network density in this field is 0.2646, which is small, indicating that the relationship between keywords is not very close, reflecting less interaction of knowledge content points in this field, and the research content is extensive but not concentrated. Centrality reflects the importance of each keyword in the overall network. If a node is connected with many other nodes, it indicates that this node occupies a central position in the overall network, and the value of centrality is also high [21].

It can be seen from Table 5 that the point degree centrality represents the position of the node in the network structure. The higher the value is, the more likely the keyword will appear. Hot topics such as sports management, public welfare sports, community sports, and major sports are the current research hotspots. Intermediary centrality reflects the influence of keywords on other keywords in the whole network. The greater the value, the greater the bridge function of this keyword. Sports management, community sports, sports public service system, and equalization have high intermediary centrality, which shows that these keywords have a good intermediary role in the network. Proximity centrality reflects the average distance between keywords. The lower the value, the more important the position in the network. Sports management, sports public service system, community sports, etc., have a short distance from other keywords and are close to the center, indicating that these keywords have an important position in the network [22], as shown in Table 6.

Firstly, the 48 ∗ 48 high-frequency keyword cooccurrence matrix is constructed, and then the keyword network structure diagram is drawn by using ucinet6, as shown in Table 7.

Five kinds of word groups are generated through k-core analysis, among which the red word groups are sports public service, community sports, supply, rural, equalization, supply side reform, stadiums and gymnasiums, national fitness, sports management, sports public service system, mass sports, rural sports, sports governance, rural sports public service, resource allocation, sports power, public sports, government functions, competitive sports, and sports industry as the core research hotspot; The second category is marked in blue, focusing on the government, government purchase, sports economy, social sports organizations, service supply, sports associations, policies, and other topics;

TABLE 4: Highly cited literature in the field of sports public service research.

Paper	Particular year
Concept and theoretical analysis of public sports service	2020
Discussion on the concept development and structure of China's public sports service system	2019
Building a perfect sports public service system	2020
Application and analysis of PPP mode in the field of public services	2018

TABLE 5: High-frequency keywords.

Key word	Frequency/time
Sports public service	677
Sports management	88
Sports public service system	60
Equalization	55
Government purchase	53
Mass sports	48
Stadium	45
Social sports organization	42
Community sport	42
National fitness	41
Supply	39
Rural sports	33
Government	30
Satisfaction	23
Rural sports public service	20
Governmental functions	19
Supply side reform	19
Countryside	19
Public sports	18
Sports economy	18
Evaluation index system	18
Sports governance	16
Service supply	14
Resource allocation	14
System	13
Sports power	12
Sports sociology	12
Healthy	12
Policy	12
Pattern	12
Demand	11
Government purchase of services	11
Sport industry	10
Sports rights	10
Britain	10
Competitive sports	10
Supply subject	10
Service-oriented government	9
Youth sports	9
Operating mechanism	9
Reform	9
Urban community sports public service	8
Disabled	8
Social sports	8
Sports associations	8
Performance evaluation	8
Concept	8
Structure	8

The third category is marked by black, mainly including Britain, performance evaluation, evaluation index system, Shanghai, system, satisfaction, youth sports, sports

sociology, and service-oriented government; The fourth category is pink signs, including government purchase services, urban community sports public services and operation mechanism. The last category is green, which is mainly the concept of sports public service. On the whole, some keywords are at the center of the network, indicating that these topics are the research hotspots in this field, and the keywords at the edge of the network are also the subject areas that scholars need to break through [23].

The number of articles in a journal refers to the number of research documents published in a journal in a certain period of time. By analyzing the distribution of the number of periodicals carrying research literature in a discipline or field, we can determine the core periodicals or core periodical groups of the discipline or field. It is convenient to further understand the spatial distribution of literature in different journals and provide a directional reference for researchers to select journals, publish academic achievements, and grasp research hotspots and research frontiers.

In order to understand the periodical distribution law of academic documents in the field of sports tourism research in China in recent 15 years, the periodical sources of all 464 selected documents were statistically analyzed by using the regional description method and image description method of Bradford's law. Among them, the average article density in the core area and related areas is much higher than the average value, and the discrete area accounts for more than 50% of the total number of journals, but the average article density is far from the average value, which basically conforms to the regional expression of Bradford's law, as shown in Table 8.

The functional relationship between the logarithm of cumulative journals and literature mathematics is shown in Figure 3.

In China, many scientific research achievements are produced in the field of sports sociology every year. Most of these achievements are presented in the form of papers. The distribution relationship between the number of published papers and time has two meanings. On the one hand, it can reflect the development speed and theoretical level of research in this field; On the other hand, according to the annual publication trend of his papers, he can further predict the future development trend and cutting-edge hotspots in this field. The broken line chart of the annual number of documents issued by China's sports sociology is shown in Figure 4.

Through the research, it is found that the realization of network governance of sports public service is different from the traditional single supply mode. Diversified supply subjects, trust, equal communication and coordination

TABLE 6: Centrality analysis of high-frequency keywords (part).

Serial number	Keyword	Point degree centrality	Intermediary centrality	Near centrality
1	Sports public service	46	321.45	46
2	Sports management	31	75.46	61
3	Sports public service system	24	49.22	68
4	Community sport	23	51.01	69
5	Mass sports	22	26.47	70
6	National fitness	19	21.66	73
7	Stadium	18	23.69	74
8	Equalization	18	26.21	74
9	Government purchase	16	20.21	76
10	Rural sports	16	12.97	76
11	Supply	16	19.67	76
12	Public sports	15	13.23	77
13	Governmental functions	15	7.46	77
14	Sports governance	15	9.27	77
15	Social sports organization	14	13.88	78

TABLE 7: High-frequency keyword cooccurrence matrix (part).

Key word	Sports public service	Sports management	Sports public service system	Equalization	Government purchase
Sports public service	0	69	9	41	51
Sports management		0	5	4	7
Sports public service system			0	0	0
Equalization				0	0
Government purchase					0

TABLE 8: Regional statistics of core journals in China's sports tourism field from 2000 to 2014.

Partition	Number of periodicals	Number of documents (articles)	Zai Wenbi (%)	Proportion in the total number of journals (%)	Average document density (articles/kind)
First area (core area)	3	171	36.85	17.65	57
Second area (relevant area)	5	163	35.13	29.41	33
Third area (discrete area)	9	130	28.02	52.94	14
Total	17	464	100	100	27
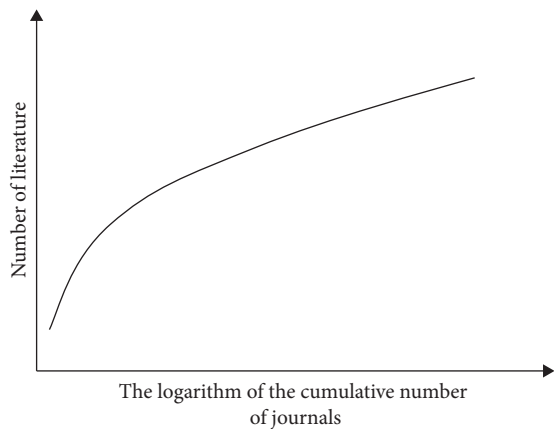
FIGURE 3: Functional relationship between logarithm of cumulative journal quantity and literature mathematics.

mechanism, and long-term repeated game cooperation are its important characteristics. Based on the research, the network model of community sports public service is preliminarily constructed [24], as shown in Figure 5.

The change curve of the number of Sports Tourism Documents in China from 2013 to 2022 is shown in Figure 6.

In the process of internal integration, it should be found that the success of the whole network governance process depends on the cooperation and participation of multiple subjects, and the important variables of their cooperation and participation are the relationship generated and maintained. However, the multisupply subject relationship of sports public service is built on maintenance, which is not only affected by the dimension of relationship quality, but also affected by many other factors. Then, the realization of sports public service supply network governance not only needs the integration of internal resources and the
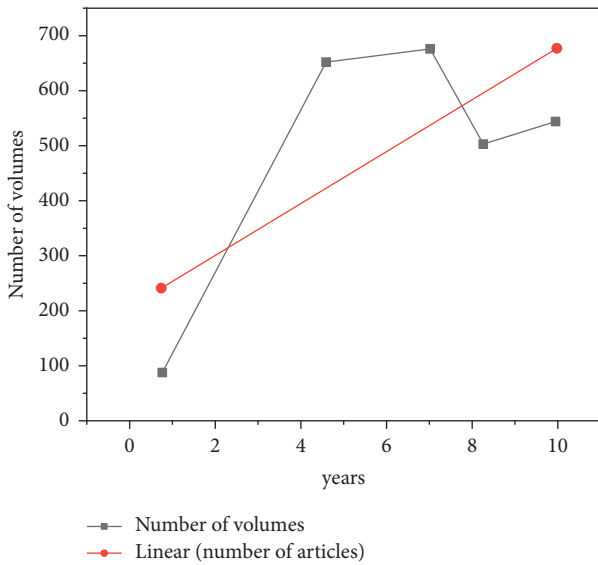
FIGURE 4: Quantity trend of sports sociology research literature in China from 2013 to 2022.

FIGURE 6: Number and year distribution of sports tourism research literature in China from 2013 to 2022.

FIGURE 5: Community sports public service network model.
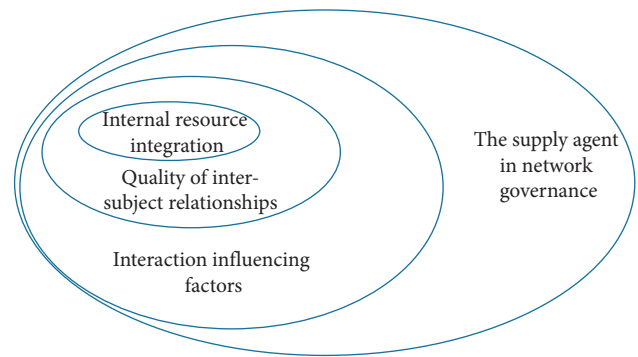
FIGURE 7: Elements of network governance.

improvement of the relationship quality between subjects but also needs the correct treatment of the factors affecting their interaction [25], as shown in Figure 7.

3.3. Lack of Research on Sports Public Services for Special Groups.

Special groups refer to groups with special responsibilities. They are vulnerable groups, including the elderly, persons with disabilities, rural marginalized women and children, and marginalized groups. The government should give these groups the right to special attention and attention. Public sports need to ensure that different groups of people get the same level of sports coverage, and the concept of "sports people's lives" needs to be considered in the development of public sports. Due to the limited capacity of the government, the public's interest in participating in the public sports services of professional groups is not strong, and the public services for the pregnancy of

professional groups are weak. Now, China's aging and urban economy are getting faster and faster, and the population of elderly, rural backward children, and women is slowly increasing. The protection of special teams' sports rules has not attracted much interest in the educational community [26]. Scholars also lack in-depth investigation and research on the system and mechanism problems encountered by the state in promoting the equalization of sports public services for all groups.

On the premise of establishing a standardized knowledge base and knowledge element, according to the above common situational assumptions, in order to directly operate the knowledge element, it is necessary to transform the technical knowledge demand into a quantifiable star model. Therefore, this paper attempts to propose two groups of new concepts.

The first group of concepts is $N(s)$ and $n(s)$, where $n(s)$ represents the number of knowledge element attribute structures. For a complete knowledge database, the number of structures in which knowledge element information is stored can be quantified and has a fixed value. For example, the columns designed for exclusive data in the database are quantitative, and $n(s)$ represents the number of structures

composed of technical problem solutions provided by users according to their own needs and characteristics. Therefore, Ni(s) represents the number of structures of the i-th possible knowledge element in the knowledge set, and ni(s) represents the number of possible knowledge element structures of the problem solution provided by I users in the process of approaching the technical problem demand solution. If the user is more clear about the problem solution structure attribute itself, the number of possible problem solution structures provided will increase. If the number of attributes exceeds the number of knowledge elements, the knowledge element structure may not meet the user's needs or supplement the subclass of demand solutions.

The second group of concepts is N(T) and n(t), where N(T) represents the number of attribute keys contained in the knowledge element content in the knowledge set, n(T) represents the number of attribute keys of the required knowledge content provided by the user, and Ni(T) and ni(t) are similar to those defined in the first group of concepts. Similarly, when the user provides more content keywords about the demand knowledge, the more likely it is to approach the knowledge solution of the demand, but when there are too many content keywords, the mismatch of knowledge elements or the change of dependency relationship of knowledge elements may occur.

Based on the concepts of the number of knowledge element structure items and the number of knowledge element content attributes, combined with the above assumptions, the mathematical model of technical knowledge service is established as follows:

(1) Knowledge element structure containment: in the fuzzy knowledge set, when the structure quantity of i knowledge element itself is greater than or equal to a certain proportion of the demand knowledge solution structure quantity of I user demand or submitted by i user according to preference, the knowledge structure containment is considered optional, as shown in the following formula:

$$a(i)N_i(S) \geq n_i(s). \tag{2}$$

a (i) is the matching proportion coefficient of knowledge element I corresponding to user I at the knowledge tree structure point, which can be selected appropriately.

(2) Knowledge element content attribute containment. In the fuzzy knowledge set, when the number of possible solution I knowledge element primary key attributes is greater than or equal to a certain proportion of the number of user requirements or the number of demand knowledge solution content primary key attributes submitted by I users according to their preferences, it is considered that knowledge matching is optional, as shown in the following formula:

$$b(i)N_i(T) \geq n_i(t). \tag{3}$$

b(i) is the matching proportion coefficient of knowledge element I corresponding to user I in the primary key of the knowledge tree content attribute, which can be selected appropriately.

(3) Knowledge is available. When the structure and content of knowledge are based on the above conditions, and the result at least meets the user's expectations for the knowledge structure and content of problem solving, knowledge content is the goal of success. At the same time, in order to control falling into local fraud scenarios, the solution is further limited to include various problem solving techniques, when it comes to higher than standard requirements, as shown in the following formulas:

$$\text{Max}[a(i)N_i(S) - n_i(s)] + [b(i)N_i(T) - n_i(t)]. \tag{4}$$

$$\sum_{i=1}^{n}[a(i)N_i(S) + b(i)N_i(T)] \geq \sum_{i=1}^{n}[n_i(s) + n_i(t)]. \tag{5}$$

$$a(i)N_{\max}(S) \geq a(i)N_i(S). \tag{6}$$

$$a(i)N_i(S) \geq n_i(s). \tag{7}$$

$$b(i)N_{\max}(T) \geq b(i)N_i(T). \tag{8}$$

$$b(i)N_i(T) \geq n_i(t). \tag{9}$$

$$N_i(S) = \sum_{i=1}^{it} N_{ij}(S). \tag{10}$$

$$N_i(T) = \sum_{i=1}^{it} N_{ij}(T). \tag{11}$$

For formula (4), if the objective function is to find the optimal solution, the problem solution will become the only solution, which obviously loses the initiating characteristics of the knowledge solution. Therefore, in order to maintain the heuristic of the solution, the selected knowledge elements with better isomorphism and better content matching should be collected to generate knowledge blocks of the appropriate size to prepare for the operation of knowledge fusion gene fragments. Find the optimal value of the gene block containing the number of knowledge elements C (the smaller its accuracy is, the higher the heuristic knowledge solution may be, and it will lose significance in macro). Therefore, in order to obtain the optimal knowledge block, the objective function is obtained after deformation, as shown in the following formulas:

$$\text{Min}\left[cn_i(s) - \sum_{i=1}^{n} a(i)N_i\left(S_j\right)\right] + \left[cn_t(t) - \sum_{i=1}^{n} b(i)N_i\left(T_j\right)\right].$$

$$(12)$$

$$\sum_{i=1}^{n} \left[a(i)N_i(S) + b(i)N_i(T)\right] \geq \sum_{i=1}^{n} \left[n_i(s) - n_i(t)\right]. \quad (13)$$

$$a(i)N_{\max}(S) \geq a(i)N_i(S) \geq n_i(t). \quad (14)$$

$$b(i)N_{\max}(T) \geq b(i)N_i(T) \geq n_i(s). \quad (15)$$

$$N_i(S) = \sum_{i=1}^{it} N_{ij}(T). \quad (16)$$

$$N_i(T) = \sum_{i=1}^{it} N_{ij}(S). \quad (17)$$

4. Results and Analysis

With the gradual advancement of rural development and rural revitalization strategies, the research on rural sports by professionals and scholars has gradually increased. In recent years, although my country's public sports services have achieved success, there is still a big difference between the quality and quantity of rural public sports in my country and the needs of the rural masses [27]. China's rural sports public service scientific research is also emerging. The researchers conducted in-depth research on the significance, existing problems, and protection of rural sports in our country. Research shows that the rural sports public service in my country has a negative impact on the development of sports facilities, the number of sports coaches, managers, and the number of people engaged in sports activities. The government should increase its support for the development of rural sports.

Under the background of rural revitalization, my country's rural structure has undergone major changes, gradually changing the main body from individual farmers to a new situation in which many factors, such as immigrants and farmers, work together. The change of rural mass identity makes the supply object of rural sports public service become complex. Different objects have different sports needs. Scholars should pay attention to how to adjust the supply mode to meet the sports needs of different objects [28]. In addition, under the social background of sports power, how to strengthen the supply of rural sports facilities, how to improve the supply structure of rural sports public service, and how to serve different supply objects will also be the focus of the research on the supply of rural sports public service in the future.

Based on the background of the information age, the integration of information networks and the development of public services have created opportunities to support the modernization of informatization and public sports. Smart sports services should reflect current characteristics, meet public sports needs in principle, affect sports equipment and sports expertise, and be used for public works, monitoring, and evaluation. The research and development of sports to public services such as the Internet, cloud computing, 5G technology, and other information networks requires comprehensive research, and cooperative research in this field will continue in the future.

The central and local governments have unclear rights and responsibilities and overlapping functions in the field of sports public services. The responsibilities and rights of some sports public services do not match the financial capacity of local governments. At this stage, to strengthen the construction of sports public service, we must accurately define the sports public service functions of the central government and local governments. Not all sports public services need the intervention of governments at all levels. Therefore, the research on sports public service must clarify the responsibilities of sports public service between governments at all levels and strengthen the research on the responsibilities of sports public service between governments at all levels.

The public sports model is an important basis for the balance of urban and rural sports. To measure the effectiveness of public sports services, we need to develop appropriate, researched models of public sports services. The development and implementation of public sports service models can support the development of high-quality public health services. The landscape of public service sports has not changed. Local government departments should clarify the minimum standards of sports public services such as sports facilities services and sports activities services according to the economic and social development of the region and implement them widely in the region. Therefore, from the perspective of understanding the differences between urban and rural areas, East and West, combined with the current situation of public services in multiple regions, through research and demonstration, the public sports service model will be developed. After the design, through continuous efforts, the gap between urban and rural areas and the eastern and western regions in public sports will be gradually narrowed so that most people can realize the importance of public sports and complete public services, to achieve the goal of equalization of sports public services as soon as possible.

Performance evaluation of sports public services, as an effective entry point for government management decision-making and function transformation, has attracted widespread attention from local governments at all levels and academics. In the field of research on sports public services in China, most scholars have conducted more research on supply subjects, supply content, and people's needs, while less research has been conducted on the performance evaluation of sports public services. Research on the evaluation of the performance of sports public services in China can raise the government's awareness of the importance of sports public service supply and institutional construction. By studying the content, evaluation index system, and evaluation methods of sports public service performance evaluation, a wide range of scholars can promote the systematization and standardization of sports public service management and further promote the transformation of government functions.

5. Conclusion

It proves that the problem of promoting public sports service research based on measurement data in my country can be solved. Give play to the role of public services and improve the people's enjoyment of public services. There are big differences in the development of public service sports in my country. Uncertainty in development often occurs in eastern and western regions, between urban and rural areas, and between groups. Equitable access to public sports services has always been a goal set by governments at all levels. At present, China is still exploring ways and means to achieve a balance in public sports services. The majority of scholars should strengthen the research on the equalization of sports public services for vulnerable groups, urban-rural fringe, and rural poor areas, and timely summarize the experience in the process of realizing the equalization of sports public services outside China, which has important theoretical and practical significance for China to achieve the goal of equalization of sports public services as soon as possible.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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Research Article

Government Structure, Political Connection, and Enterprise Resource Acquisition of Multidimensional Environmental Impact: An Empirical Study Based on the Structural Equation Model

Qiuying Lv [iD] [1,2] and Chen Chen[2]

[1]*School of Social and Public Management, East China University of Science and Technology, Shanghai 200237, China*
[2]*Business School, Fuyang Normal University, Fuyang 236000, China*

Correspondence should be addressed to Qiuying Lv; 200707008@fynu.edu.cn

Preferential access to scarce resources can bring competitive advantages and better performance to enterprises. However, the existing literature has a relatively single research path on the influencing factors of enterprise resource access, which has lack of sufficient research from the perspective of multidimensional environment. In particular, as an important factor affecting enterprises' access to external resources, few studies have given empirical results on the impact of political factors such as government structure on enterprise resource access. Preferential access to scarce resources can bring competitive advantages and better performance to enterprises. However, the existing literature has a relatively single research path on the influencing factors of enterprise resource access, which lacks sufficient research from the perspective of multidimensional environment. In particular, as an important factor affecting enterprises' access to external resources, few studies have given empirical results on the impact of political factors such as government structure on enterprise resource access. Through the discussion of multidimensional environmental factors, this paper can provide theoretical reference for the reform of government institutions and the establishment of good political relations between enterprises and the government. Focusing on the multidimensional environment of government structure, political relations, and enterprise resource acquisition, this paper takes 129 enterprises in Central China as samples and uses the structural equation model to empirically verify the relationship between the formalization of government structure, liaison mechanism, decentralization, and enterprise resource acquisition, especially the easing effect of political relations. The results show that the formalization of government structure is promoting enterprises to obtain policy resources and financial resources; the liaison mechanism helps enterprises to obtain financial resources and market resources; decentralization has a significant positive impact on enterprises' access to policy resources and market resources; and political connection magnifies the positive effect of government structure on enterprise resource acquisition, but there are differences in different dimensions.

1. Introduction

Based on the resource theory, preferential access to valuable resources can bring competitive advantage to enterprises and can be translated into better performance [1], so the influencing factors of enterprise resource access have been a hot topic of academic research. Scholars mainly study the external resource acquisition of Chinese enterprises from two aspects: first, the factors of the enterprise itself, such as

the internal resources of the enterprise and managers' relations and talents; second, the influence of nonmarket environmental factors, such as collaborative innovation network and social capital, on key resources and information of enterprises. The government-enterprise network, political ties, and government policies affect the enterprise's resource acquisition [2, 3]. Among them, scholars pay special attention to the political factors in the nonmarket environment. Almost every enterprise is influenced by government

policy and regulation [4], ignoring the relationship with the government may have a negative effect on the competitive advantage of enterprises. Government networks and political connections are the relational assets of political factors, and enterprises can decide whether to construct the relational networks or take political actions to obtain the resources. However, the author found in the investigation that the government structure, which cannot be controlled by the enterprise, is also affecting the acquisition of enterprise resources. Studies have shown that government is not a single entity and that the relationships between government agencies affect their ability to provide benefits to business [5]. These studies have improved our understanding of the effects of government structural factors on firm resource acquisition, but we still know little about what other structural factors affect firm resource acquisition and the magnitude of the effects.

The purpose of this paper is to break through the limitations of the research on the influence of political factors, focus on multidimensional environmental factors, regard the government structure as a variable, and use political connection factors to explore the relationship between it and government structure and enterprise resource acquisition. On the basis of literature analysis, interviews, and expert opinions, this paper puts forward three factors (formalization, liaison mechanism, and decentralization) of government structure influencing enterprise resources and uses the theory of political connection to deepen the understanding of the relationship between them. We tested our hypothesis through a questionnaire survey of 129 enterprises in central China, in order to fill in the gap in the research on the relationship between government structure and enterprise resources and to gain a deep understanding of the law of government structure change. It is also helpful for enterprises to understand the operating mode and characteristics of government structure and to take targeted strategies to establish political ties and access to resources.

The rest of this article is organized as follows. Section 2 provides theoretical motivations and research assumptions, followed by an overview of the research design, data collection, and data analysis and followed by a substantive interpretation of the data and discussion of the findings.

2. Theoretical Background

2.1. Dimensions of Government Structure. The early administrative theory pointed out that the formal organizational structure has the basic characteristics of hierarchy, specialization, and formalization [6], which is the basic starting point of the evolution of organizational theory. Organization hierarchization requires each individual to have a clear position in the pyramid-shaped relationship control structure, which is a kind of hierarchical structure based on authority difference and has the principle of unified command. Specialization involves how the various positions are organized into work units and departments and where jobs with the same attributes or relationships should be located within the same department [7]. A hierarchical and professional organization must meet some formal

specifications to ensure consistent results. In addition to the vertical control of the hierarchical and horizontal relationship to coordinate the functional departments, there exist the power differences caused by the rank and function within the organization.

In the study of organizational structure effectiveness, more scholars choose to use case study and questionnaire survey methods. Among them, there are 12 dimensions of organizational structure discussed by the scale method, such as formalization, specialization, standardization, personnel ratio, decentralization, complexity, authorization, and vertical range, which can be summarized and merged into four measurement dimensions, such as complexity, formalization, decentralization, and liaison mechanism [8–11].

Since the introduction of the reform and opening-up policy, the Chinese government has carried out eight organizational reforms, mainly to solve the problems of overstaffed institutions, numerous departments, overlapping responsibilities, and unclear functions. The Chinese government improves government performance by streamlining institutions and personnel, transforming government functions, and rationalizing departmental responsibilities. At present, China's government level is generally a five-level system of the central, provincial, municipal, county, and township levels, but in fact, the government level has the characteristics of the same level of heterogeneity, the combination of virtual reality, the coexistence of rank, and dislocation. The Chinese government has formally completed the institutional reform of merger and reorganization, but has not made any real changes in terms of structural adjustment and decentralization.

This paper selects and adjusts the measurement dimensions through the content of previous interviews and puts forward three dimensions of enterprise resource acquisition, which are formalization, liaison mechanism, and decentralization, by means of organizational structure theory research, combined with the reality of the Chinese government, and on the basis of listening to experts' opinions. What needs to be explained here is that we define the government structure as the local governments at the municipal (district) and county levels below the provincial level because the government agencies in this area have more contacts with enterprises in urban economic management so that certain dimensions can be verified.

2.2. Enterprise Resources. This paper studies the impact of government structure on resource acquisition, so we use the results of corporate political behavior to determine the types of corporate resources. Generally speaking, the results of corporate political behavior are divided into three categories: policy performance, financial performance, and market performance [12]. Accordingly, we define the types of enterprise resources in this paper as: policy resources, financial resources, and market resources. Among them, policy resources are government subsidies, tax exemptions, bailouts or support [13–15], lower administrative and regulatory barriers [16], and changes in public policy to help firms maintain their competitive advantage [17]. Financial

resources refer to the availability or low cost of long-term debt financing [18–20]. Market resources refer to the resources obtained by an enterprise that have an impact on market competition, business promotion, and sales. Examples include greater pricing power [16], participation in international competition and trade expansion [21], and income from obtaining business licenses or government contracts [17].

2.3. Political Connection.

Because governments control critical information and resources, it is difficult for companies to gain a sustainable competitive advantage if they do not pay attention to the political process and dynamics in the operating environment and adopt political strategies. Therefore, the act of political linkage is crucial for companies to gain access to key resources and facilitate economic exchanges [22]. The idea of a positive relationship between political connection and firm performance has been demonstrated [12, 17], which provides firms with various forms of institutional support and valuable resources and information. In the study of the relationship between government structure and enterprise resource acquisition, this paper takes political relations as moderating variables and analyzes the relationship between variables.

3. Research Assumptions

3.1. Formalization.

Formalization refers to the degree of formalization in the organizational structure, including clear working procedures and instructions, various rules and regulations, working rules, guidelines. The degree of formalization is usually measured by the degree to which regulations are written and the way by which quality and performance are monitored. Therefore, the clearer the workflow of government agencies and the higher the degree of specialization of staff, the higher the efficiency of government work. For example, many enterprises pay special attention to the government's discount loan policy because the interest is very low and there is no repayment pressure, which is very suitable for the business turnover of enterprises. However, the discount loan policy has many conditions and restrictions. If the relevant government departments do not give a detailed explanation of the latest policy, it will increase the various costs for enterprises to apply for discount loans. Similarly, in the process of applying for discount loans, the simplification of government procedures and the degree of specialization of staff will directly or indirectly affect the probability of successful application. At the same time, formalization can effectively reduce the impact of individual differences on the organization. A high degree of formalization means that individuals in an organization have low autonomy in the content and means of work. On the contrary, it means that individuals have greater authority in handling organizational affairs. For example, when an enterprise applies for government project funding, if the government agencies carry out procedures such as document release, selection, and publicity according to uniform requirements and standards, then the enterprise

does not need to contact the person in charge of the agency deliberately, and the absence of such informal contact does not hinder the enterprise from applying for the project. Based on the above discussion, the following assumptions are put forward:

> H1: the formalization of government structure has a positive influence on promoting the acquisition of enterprise policy resources
>
> H2: the formalization of government structure has a positive influence on promoting the acquisition of financial resources of enterprises
>
> H3: the formalization of government structure has a positive influence on promoting enterprises' access to market resources

3.2. Liaison Mechanism.

The liaison mechanism mainly refers to the communication and liaison mechanism among the various departments in the organization. As a result of the horizontal division of labour brought about by specialization, different functional units have been created within the organization that are independent of each other, and the organizational structure needs to coordinate these different functional units so that they are less conflict-ridden and interdependent. The degree of interdependence among the various branches of government may be determined by their degree of differentiation. Some scholars have suggested that the government governance model is between the administrative and the market boundary. The department presents the different system logic and the behavior result: first is to administer according to institutionalized procedures, which is based on the administrative mechanism of bureaucracy; second is to administer in a market-based manner, which is the management mechanism extended by breaking the fetters of bureaucracy. The departmental mechanism of bureaucratic logic is considered to be traditional and procedural, and departments act in accordance with procedures and responsibilities. The latter kind of management mechanism is unconventional and flexible, and departments have similar functions and communicate closely with enterprises under this kind of market logic. Two different departmental operating mechanisms bring different values, rules, and institutional arrangements, which increase the difficulty of coordination. For example, if a business wants to promote a new business related to local economic planning through the government, the government department in charge of the business tends to support the business, while the department with approval authority has bureaucratic logic due to functional differences. Applications for this business may be rejected by examination and approval department, if the necessary liaison mechanisms between departments are not in place. Similarly, in the process of government discount or interest-free loans, the provision of materials, interpretation of policies, and specific handling involve different levels and different machines. If the standards are not uniform and there are barriers to communication, the cost of business handling will increase. Based on the above discussion, the following assumptions are put forward:

H4: the liaison mechanism of government structure has a positive influence on promoting the acquisition of enterprise policy resources

H5: the liaison mechanism of government structure has a positive influence on promoting the acquisition of enterprise financial resources

H6: the liaison mechanism of government structure plays a positive influence on promoting enterprises' access to market resources

3.3. Decentralization. Generally speaking, the control system at the organizational level can ensure the rapid execution of orders from top to bottom. However, in the complex and diverse unitary centralized system, it is a big problem in the practice of state governance to deal with the contradiction between it and effective governance. Decentralization mechanism is an important way proposed by scholars to alleviate the contradiction between the centralized system and effective governance [23]. Since the reform and opening up, the central government has delegated greater power to provincial governments, and the financial relationship between them has been straightened out. With the implementation of decentralization, decentralization among local governments is increasing. However, among provincial, municipal, county, and township governments, financial power is excessively concentrated upward and administrative power is excessively concentrated downward, which hinders the improvement of local government governance performance. In addition to the vertical government hierarchy, the horizontal departmental setup within the government also involves the issue of decentralization. The degree of power concentration and distribution affects the effectiveness of organizational control. When the power of an organization or department is highly concentrated, decisions are made by senior managers, and it is difficult for managers to make accurate decisions due to the limited amount of information. If the power of organizations or departments is decentralized, more grass-roots organizations or people can participate in the decision-making process, which can help reduce the uncertainty of information and make more satisfactory decisions [24]. For example, when several enterprises compete for funds for a government project, the grass-roots government departments or staff often have various business contacts with the enterprise, so they will better understand the real conditions of the enterprise. Therefore, increasing the decision-making power of the grass-roots government departments or staff, such as preliminary review, may reduce the probability of improper allocation of project resources, not only maintaining the reputation of the government departments but also saving the time cost of the enterprise. In addition, enterprises often have some practical difficulties that need to be solved urgently, such as slow-moving products and brain drain, but these difficulties are not within the scope of the work responsibilities of the middle- and high-level government agencies, and the grass-roots government organizations or grass-roots staff lack the actual power to solve problems. Once the grass-roots

government is given more powers, the efficiency of enterprises' access to resources may be greatly improved. Based on the above discussion, the following assumptions are put forward:

H7: the decentralization of government agencies has a positive influence on promoting the acquisition of enterprise policy resources.

H8: the decentralization of government agencies has a positive influence on promoting the acquisition of financial resources of enterprises.

H9: the decentralization of government agencies plays a positive influence on promoting enterprises' access to market resources.

3.4. Moderating Role of Political Connection. The relationship system formed by groups or individuals is included in the norms, levels, departments, coordination, power, and other elements of government organizational structure. Enterprise's political connection is one of the important components, which mainly refers to the establishment of good contacts and relationships between enterprises and the government so that enterprises can be protected by the government and reduce the uncertainty in their operations [25, 26]. Specifically, high-level political ties enable enterprises to avoid the predatory behavior of government grass-roots personnel and improve their relative bargaining power when dealing with government officials [27]. If the liaison mechanism between government departments is not smooth, enterprises can offset this negative impact by directly or indirectly establishing contact with government agencies that have control over government departments [28]. For example, when an enterprise applies for a certain qualification standard certification, the grass-roots personnel of the government refuses the application of the enterprise on the ground that there is no relevant certification standard in the region. If the enterprise has a familiar high-level political relationship, it can avoid grass-roots personnel and communicate directly with high-level officials. May be, it can be solved by learning from the certification standards of other regions and adopting the filing system. Even if the business is finally handled by the grass-roots personnel, with the contact of senior officials, the enterprise will increase the probability of successfully handling the business. However, some studies have also shown that the value created by political connections may be weakened by the checks and balances between government departments [5], or political capital may become a negative lift after a sudden change in political structure [29]. Based on the above discussion, the following assumptions are put forward:

H10: political connection has a positive moderating effect between government structure and enterprise policy resources and market resources. There is a moderating effect between government structure and enterprise financial resources, but there are differences between different dimensions of government structure.

TABLE 1: Basic information of samples.

Index	Basic feature	Times	Ratio (%)
Enterprise nature	State-owned enterprise	16	112.4
	Full foreign-owned enterprises	11	8.5
	Private enterprise	102	79.1
Enterprise establishment time	3–5 years	446	35.7
	6–9 years	557	44.2
	10–15 years	119	14.7
	More than 15 years	7	5.4
Education level of interviewees	High school or technical secondary school	101	32.9
	Universities and colleges	135	44
	Undergraduate course	54	17.6
	Masters	17	5.5
Enterprise scale	≤20 people	28	21.7
	21–50 people	59	45.74
	51–100 people	27	20.93
	101–200 people	8	6.2
	201–500 people	4	3.1
	More than 500 people	3	2.33
Industry nature	Planting and breeding	36	27.9
	Food and commerce	34	26.4
	Electron	16	12.4
	Science and technology	15	11.6
	Machinery manufacturing	28	21.7

4. Research Design

4.1. Data Sources. The data used in this study comes from a questionnaire survey, and the samples were collected from 129 enterprises in F, H, and B cities in A province, S city in H province, and H cities in S province in central China. Among the 129 enterprises, 36 are planting and breeding enterprises, 34 are food trade enterprises, 31 are electronics and technology enterprises, and 28 are machinery manufacturing enterprises. There are 7 enterprises that have been established for more than 15 years, 76 enterprises that have been established for 6 to 15 years, and 46 enterprises that have been newly established for 3 to 5 years. Among them, about 79% are private enterprises, and 94.57% are small- and medium-sized enterprises with less than 200 employees.

There are two reasons for choosing the central region: first of all, the acquisition of external resources of enterprises in the central region can better represent the actual level of China; secondly, the model and operational efficiency of the government structure of neighboring provinces in the central region are similar.

In order to test the appropriateness of the contents of the questionnaire, a pilot test was conducted to determine that these questions are applicable to the political and business environment in central China. The results of the pilot questionnaire show that the respondents are indifferent and the response rate is low. To maximize the reliability of data. First of all, we seek the support of the local Federation of Industry and Commerce, which will provide the list of enterprises under investigation and contact the person in charge of the enterprises; secondly, all selected enterprises have been established for at least 3 years, which is used to reduce the biased answer based on on-off positive or

negative experiences [30]. Finally, the interviewees are the senior managers of each enterprise, who know well about the operation of government agencies and enterprises. The time span of this survey is from April 2020 to May 2021, and a total of 387 questionnaires were distributed (among them, there are 141 in the F city, 54 in the H city, 111 in the B city, 39 in the S city, and 42 in the H city). 320 questionnaires were collected, 13 invalid questionnaires were excluded, and finally, 307 valid questionnaires were obtained, with an effective recovery rate of 79%. The 307 respondents were heads or senior managers of 129 enterprises, of which about 67% had college degree or above and the rest had high school or technical secondary school degree. Most of the respondents have worked in this enterprise for at least three years, and only about 14% of the respondents have worked in this enterprise for one year, but have worked in other enterprises. The sample information is shown in Table 1.

4.2. Model Construction and Introduction

4.2.1. Variable Explanation. Based on the domestic and foreign mature scales, according to the interviews with some enterprise executives and heads of government agencies, combined with the organizational chart of government websites, relevant policies, procedures, and related resource allocation publicity information, the variable measurement of this study was evaluated by peer experts, and the measurement scales were determined, all of which were measured by the Likert 5-point method.

(1) The Explained Variable. The measurement of this variable divides enterprise resources into three dimensions: policy resources, financial resources, and market resources, and
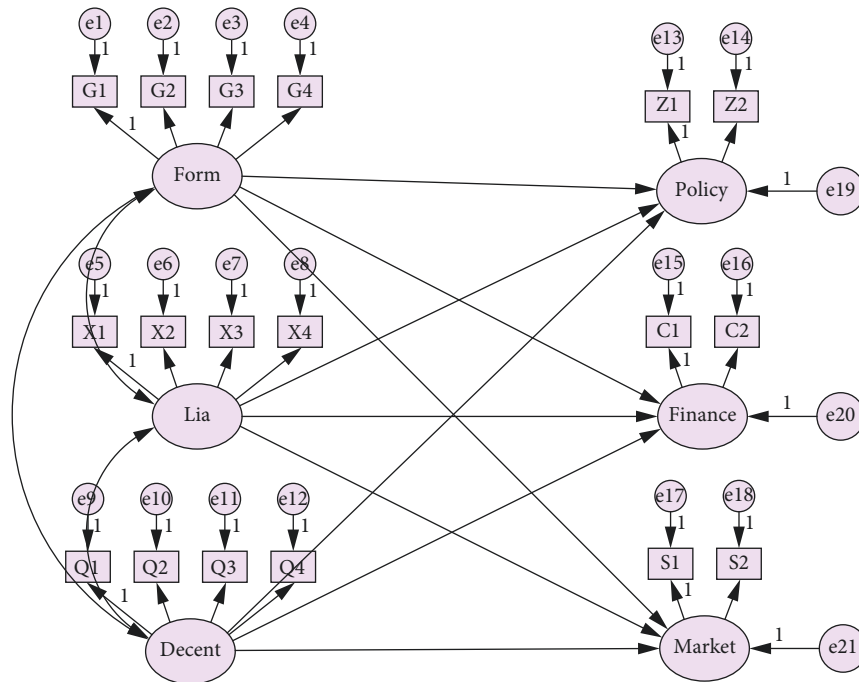
FIGURE 1: SEM model (established by AMOS).

each dimension contains two measurement indicators, which are measured separately.

(2) Core Variables. The measurement of this variable takes the government structure as a comprehensive variable composed of three dimensions: formalization, liaison mechanism, and decentralization, and each dimension contains four measurement indicators. Among them, the measurement items of formalization dimension include the government has a clear workflow, the government staff is highly specialized, the government has clear written documents such as policies and systems related to enterprise business, and the government has clear job evaluation standards. The measurement items of the liaison mechanism include the following: the government has formal communication or feedback channels, the government has special liaison departments or personnel for specific projects of enterprises, the government lead agency is responsible for coordinating cross-business of enterprises, and the government specialized agency is responsible for resolving business conflicts of enterprises. The measurement items of decentralization include the following: there are few reporting and approval links for enterprises to handle business, the grass-roots government departments have decision-making power over enterprises' business, the grass-roots government staff have decision-making power over enterprises' business, and the grass-roots government departments can effectively supervise enterprises.

(3) Adjusting Variables. This variable is a measure to determine the political connection through the item "in the past three years, the senior executives of affiliated enterprises have established close ties with government officials."

4.2.2. Latent Variable and Structural Equation Model. The structural equation model is constructed with formalization (Form), liaison mechanism (Lia), decentralization (Decent), policy resources (Policy), financial resources (Finance), and market resources (Market) as 6 latent variables (see Figure 1). Form, Lia, and Decent each contains four measurement variables, and Policy, Finance and Market each contains two observation variables (see Table 2). *e* represents the residual term.

5. Empirical Analysis

5.1. Construct Reliability Test. Construct reliability (CR) and average variance extracted (AVE) are called convergence validity, and CR means that the test indicators measuring the same potential trait (construct) will fall on a common factor. Generally speaking, if CR is greater than 0.6 and AVE is greater than 0.5, the questionnaire has good aggregation reliability. Results are shown in Table 3. CR and AVE of all dimensions are basically within the acceptable range, which indicates that the questionnaire has good aggregation reliability.

5.2. Structural Validity Test. As for the test results of structural validity, as shown in Table 4, all indicators are within the acceptable range, which is not far from the reference value, indicating that the structural validity of the questionnaire is good.

5.3. Discriminant Validity Test. Discriminant validity is a distinguishing index that characterizes each dimension. If there is a significant correlation among the latent variables in the structural equation model and the AVE value under the root sign of each latent variable is greater than the

TABLE 2: Latent variables and observed variables.

Latent variable	Observation variable	Coding
Formalization	Workflow	G1
	Professionalization	G2
	Policies and systems	G3
	Evaluation criterion	G4
Liaison mechanism	Communication channel	X1
	Specific contact	X2
	Work crossing	X3
	Work conflict	X4
Decentralization	Approval link	Q1
	Grass-roots department	Q2
	Grass-roots personnel	Q3
	Grass-roots supervision	Q4
Policy resources	Policy information	Z1
	Government subsidy	Z2
Financial resources	External financing	C1
	Interest-free loan	C2
Market resources	Market expansion	S1
	Talent acquisition	S2

TABLE 3: Construct reliability.

Path			Path coefficient	CR	AVE
Workflow	<---	Form	0.809		
Professionalization	<---	Form	0.965	0.942	0.803
Policies and systems	<---	Form	0.917		
Evaluation criterion	<---	Form	0.886		
Communication channels	<---	Lia	0.897		
Specific contact	<---	Lia	0.992	0.942	0.803
Work crossing	<---	Lia	0.841		
Work conflict	<---	Lia	0.847		
Approval link	<---	Decent	0.871		
Grass-roots department	<---	Decent	0.886		
Grass-roots personnel	<---	Decent	0.966	0.947	0.817
Grass-roots supervision	<---	Decent	0.890		
Policy Information	<---	Policy	0.755	0.705	0.545
Government subsidy	<---	Policy	0.721		
External Financing	<---	Finance	0.580	0.616	0.449
Interest-free loan	<---	Finance	0.749		
Market expanding	<---	Market	0.588	0.701	0.549
Talent acquisition	<---	Market	0.867		

TABLE 4: Structural validity.

Model fit		Recommended values	Measurement model
Absolute fit	GFI	>0.9	0.827
	AGFI	>0.9	0.759
	RMSEA	<0.08	0.107
Baseline comparisons	NFI	>0.9	0.887
	RFI	>0.9	0.860
	IFI	>0.9	0.910
	TLI	>0.9	0.888
	CFI	>0.9	0.910
Parsimony-adjusted measures	PGFI	>0.5	0.595
	PNFI	>0.5	0.713
	CMIN/ DF	<5	4.503

TABLE 5: Discriminant validity.

	Form	Lia	Decent	Policy	Finance	Market
Form	0.803					
Lia	0.436	0.803				
Decent	0.564	0.708	0.817			
Policy	0.409	0.227	0.383	0.545		
Finance	0.267	0.329	0.264	0.051	0.449	
Market	0.239	0.393	0.383	0.074	0.127	0.549
SQRT (AVE)	0.896	0.896	0.904	0.738	0.670	0.741

TABLE 6: Estimation results of path and load coefficient.

Path			Estimate	SE	CR	P	Label
Policy	<---	Form	0.158	0.038	4.175	<0.001	Sig
Finance	<---	Form	0.058	0.027	2.16	0.031	Weak sig
Market	<---	Form	−0.009	0.026	−0.331	0.741	No sig
Policy	<---	Lia	−0.058	0.036	−1.597	0.11	No sig
Finance	<---	Lia	0.1	0.029	3.404	<0.001	Sig
Market	<---	Lia	0.057	0.027	2.078	0.038	Weak sig
Policy	<---	Decent	0.142	0.041	3.472	<0.001	Sig
Finance	<---	Decent	−0.004	0.028	−0.141	0.888	No sig
Market	<---	Decent	0.109	0.033	3.313	<0.001	Sig

correlation coefficient between each latent variable and other latent variables, it is considered that the questionnaire has good discrimination validity. Results are shown in Table 5. The AVE values under the root signs of the three latent variables are all larger than the correlation coefficient values between themselves and other latent variables, which proves that the discrimination validity of the questionnaire is good.

5.4. Hypothesis Test

5.4.1. The Main Effect.
The path coefficients between the core variables and the explained variables are shown in

Table 6, and the relationships reflected by them can be summarized as follows: ① the degree of formalization of government structure has a positive effect on enterprises' access to policy resources. Hypothesis 1 is supported. Although the positive effect of formalized structure on financial resources is weakly significant, the conclusion of hypothesis 2 can also be confirmed. However, the impact of standardized structure on enterprise market resources is not significant. Therefore, hypothesis 3 is not supported. ② The effect of liaison mechanism on enterprise policy resources is not significant, and hypothesis 4 is not supported. The liaison mechanism is conducive to the acquisition of financial resources, and hypothesis 5 is proved. The impact of liaison mechanism on enterprise market resources is positively and weakly significant, and hypothesis 6 is supported. However, the impact on enterprise policy resources is not significant. Therefore, hypotheses 5 and 6 are confirmed. ③
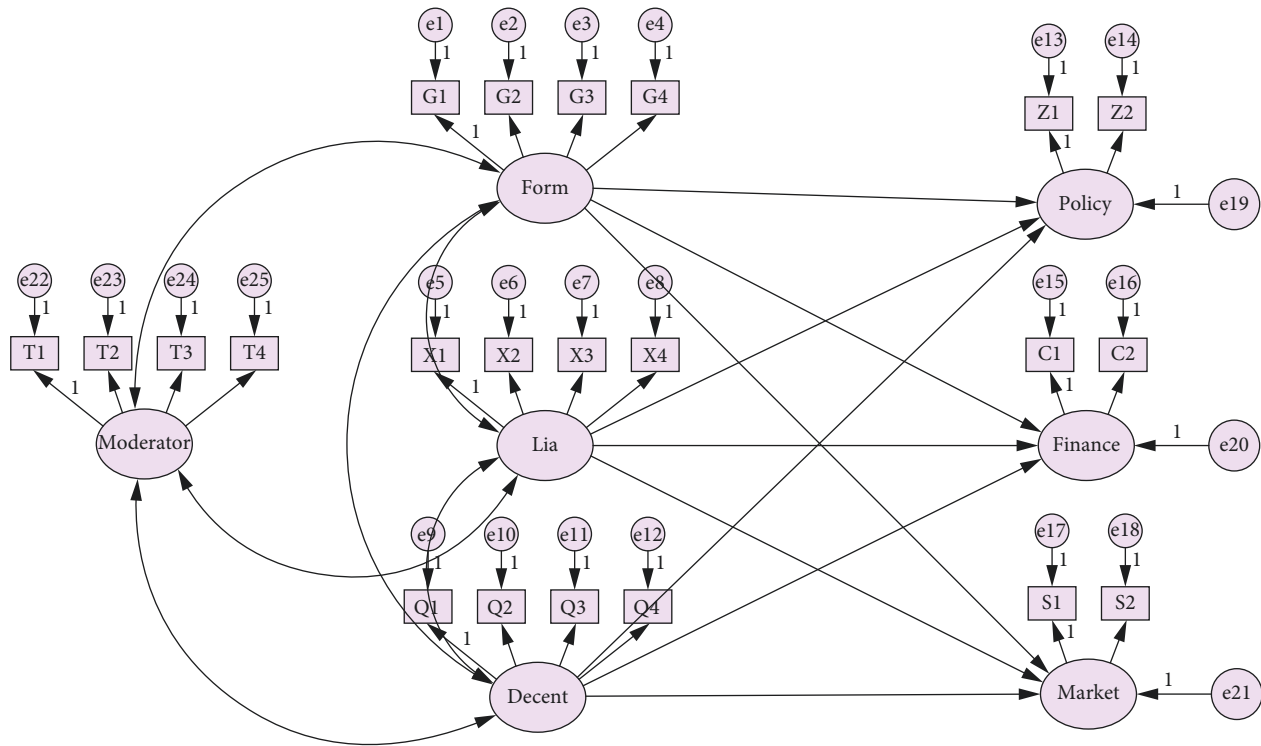
Figure 2: SEM model (including adjustment variables).

Table 7: Adjustment variable path coefficient table.

	Path		Estimate	SE	CR	P	Label
Policy	<---	Form moderator	0.081	0.013	6.184	<0.001	Sig
Finance	<---	Form moderator	0.016	0.01	1.671	0.095	No sig
Market	<---	Form moderator	0.032	0.01	3.18	0.001	Sig
Policy	<---	Lia moderator	0.042	0.009	4.522	<0.001	Sig
Finance	<---	Lia moderator	0.004	0.007	0.625	0.532	No sig
Market	<---	Lia moderator	0.038	0.008	4.783	<0.001	Sig
Policy	<---	Decent moderator	0.042	0.018	2.383	0.017	Sig
Finance	<---	Decent moderator	0.053	0.015	3.528	<0.001	Sig
Market	<---	Decent moderator	0.025	0.012	2.033	0.042	Sig

Decentralization has a significant positive impact on the acquisition of enterprise policy resources and market resources, but not on enterprise financial resources. Therefore, assumptions 7 and 9 are true, but assumption 8 is not.

5.4.2. Regulation. The adjustment variable "political connection" is multiplied by four questions in each dimension of the independent variable, and the adjustment interaction item is constructed. And, verify the significance of the path coefficients of the moderators to policy resources, financial resources, and market resources. The model (see Figure 2) and path coefficients (see Table 7) are as follows. Table 7 shows that political ties play a positive role in regulating the various dimensions of government structure, enterprise policy resources, and market resources, while the interaction between formalization and liaison mechanism and political ties has no significant impact on enterprise financial resources. But the interaction between decentralization and political ties has a significant positive impact on enterprise financial resources. Therefore, hypothesis 10 is supported.

6. Conclusion and Enlightenment

How does the government structure affect the acquisition of enterprise resources? Through the analysis of 307 observations of 129 enterprises in central China, this paper finds that the formalized structure has a significant positive impact on the acquisition of enterprise policy resources, the liaison mechanism has a significant positive impact on the acquisition of enterprise financial resources, and the decentralization of power has a significant positive impact on the acquisition of enterprise policy resources and market resources. The formalized structure has a weak significant positive impact on the acquisition of financial resources, and the liaison mechanism has a weak significant positive impact on the acquisition of market resources. At the same time, political connection can amplify the positive effects of the three structural elements on enterprise resource acquisition, and even for variables that had no connection, such as formalization structure and enterprise market resources, decentralization, and enterprise financial resources, political

connection has played a significant positive role in regulating.

The core contribution of this paper is reflected in three aspects. Firstly, this paper provides a new idea for the study of multidimensional political factors affecting enterprise resource acquisition. The existing literature fails to consider the influence of government structure on enterprise resource acquisition and ignores the uncontrollable factors in enterprise resource acquisition. At the same time, due to the abstraction and complexity of the concept of organizational structure itself, academic circles rarely use quantitative methods to study organizational structure. Based on the three elements of government structure, such as formalization, liaison mechanism, and decentralization, this paper empirically analyzes their relationship with the political resources of enterprises and their influence degree.

Secondly, the paper points out the influence of the correct operation mode of government structure on enterprise development. When the government structure runs in a reasonable and efficient way, that is, its dimensions such as formalization, liaison mechanism, and decentralization are in a good state, both enterprises and the government benefit. For example, when a government agency conducts public service bidding, the formalization process brings reasonable and fair enterprise competition, and the government can complete the project construction at the lowest cost. Also, enterprises can put more resources into the improvement of market capacity and achieve long-term development.

Finally, the article provides a way to solve the structural obstacles of government institutions. During the period of China's transition, weak administrative institutions have created some structural obstacles. For example, the irregularities of government behavior still exist. The checks and balances between government departments weaken their ability to provide resources for enterprises; Slow public sector system may lead to the delay of approval. When power is highly concentrated, enterprises may be exploited from the grass-roots level and so on. Therefore, this kind of environment makes it necessary for enterprises to establish appropriate political ties. Through the political connection of enterprises, the uncertainty caused by structural obstacles can be reduced, and opportunities for obtaining resources can be created. However, enterprises cannot rely too much on the political ties established with the government in terms of resource acquisition. Excessive political ties will lead to increased operating costs and bribery and corruption, or inappropriate political connection leads to excessive power of enterprises, such as excessive use of public resources to enhance competitive advantage and excessive discretion of enterprise executives.

The findings of this paper have important management implications for the reform of government structure and how to build the relationship between enterprises and the government. First of all, the government structure needs to continue to deepen the reform in the following three aspects: (1) scientific, procedural, and transparent government normative acts based on legal basis. (2) Cooperation and linkage between government departments. (3)

Decentralization based on unified leadership. Secondly, in order to prevent the negative impact of government structural obstacles on enterprise resource acquisition, enterprises must have certain political ability, that is, regardless of the state of government structure; enterprises can identify different types of political problems and take different actions. There are two main ways to develop and cultivate the political ability of enterprises. (1) Previous experience: enterprises can learn to make better use of political strategies by summing up their experiences in dealing with government agencies [31]. (2) Market ability: on the basis of market ability, enterprises develop directly related political ability, which can reduce the cost of political contact. Of course, under the environment of perfect government structure elements, the market ability of enterprises can replace the function of their political ability, so as to realize the acquisition of enterprise resources.

Due to the limitation of conditions, there are still some research limitations in this paper, which need further research in the future. (1) The area where the sample is located can be further expanded. In the future, small- and medium-sized enterprises and government agencies in the east and south can be included in the research scope, and a more meaningful conclusion may be obtained by comparative analysis with the situation in the central and western regions. (2) Combining the case analysis with the questionnaire survey can not only ensure the universality of the conclusion but also help to create a new theory, which is more effective.

Data Availability

All data used to support the findings of the study are included within this article.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgments

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Research Article

Copyright Transaction Mode and Copyright Protection Risk Analysis of Green Industry from the Perspective of Information Environment

Jian Liu [iD][1] **and Xuemin Deng** [iD][2]

¹College of Humanities and Development Studies, China Agricultural University, Beijing 100083, China
²Vocational Education Center, Special Police of China, Beijing 102211, China

Correspondence should be addressed to Xuemin Deng; 2020211969@email.cufe.edu.cn

At present, the requirements of the current environment and background require us to have higher requirements for the data mode of copyright transaction. According to the previous way to conduct copyright transactions, it will cause a lot of unnecessary trouble, and according to the establishment of the copyright transaction database, we analyse the data types and patterns of copyright transactions and related copyright transaction protection measures and risk prevention. According to the copyright transaction database, we adopt BS network model, CIF copyright transaction data set model, CI data set model, data interactive query technology, and block matching technology to deal with the copyright transaction data model and copyright transaction risk prevention under the background of Informa ionization as follows: (1) we use BS network model, CIF copyright transaction data set model, and CI data set model to analyse and detect the copyright transaction data before transaction, which better reflects the network model effect of self-enhancing operation rate of copyright transaction data and effectively avoids overfitting problem. (2) By using interactive data query technology, the data presented in the preparation work before the transaction is more detailed, the samples are normalized, and the collected transaction data are tested for accuracy, which can eliminate potential dangers. (3) The method of similarity feature reconstruction of copyright transaction data set completes the extraction of association matching features of copyright transaction data system, which provides strong support for us to prevent risks and effectively match data in copyright transaction.

1. Introduction

This paper studies whether DF rules are related to the change of information environment before earnings announcement, and finds that the introduction of DF rules reduces earnings volatility and accelerates the convergence of prices before earnings announcement to the level after earnings announcement. Evidence suggests that uneven, accurate, and uneven changes in analysts' forecasts have increased the number of forward-looking disclosures. On the whole, it has not been found that the introduction of FD regulations will lead to the deterioration of the information environment before earnings announcement [1]. This paper will examine the impact of IFRS implementation on the information environment of financial analysts. In order to control mixed and concurrent events, we use companies that voluntarily implement IFRS at least two years before the mandatory date as control samples. The absolute prediction error and prediction deviation of this control sample will produce significant results only under the mandatory implementation system, and the mandatory implementation system and enterprise reporting incentives play a very important role in determining the mandatory impact [2]. The Internet is a tool to support teaching and research in a university environment. Multi-application hypermedia system provides hypertext extension in a unified user environment and embeds other media besides text. To improve the construction of a consistent application framework, an example of an intermedia session is provided [3]. With the rapid development of information technology, various advanced technical

means are constantly emerging in teaching, which promotes the reform of education and teaching. Especially with the combination of mobile Internet cloud technology and education, teachers need to make corresponding changes. This paper puts forward some views on teachers' transformation under the new information environment [4]. Data from the National Nursery Survey are used to assess the impact of price effects and marketing characteristics, which play an important role in whether firms sell specific plant categories, headquarters sales, and total sales of commercial nurseries and greenhouses for multiple plant categories. Demand factors also affect sales, and our results show that pricing factors play an important role in plant species sales and total sales [5]. The global environment encourages palm oil and other industries to reduce negative environmental impacts and assess the green level of palm oil industry according to energy conservation. This paper presents a new system tool, which can not only visualize the potential improvement potential of green performance but also represent the general situation of industry according to the actual situation [6]. Industrialization of environmental protection is one of the main trends of environmental protection development. In theoretical research and practical work, the concepts of environmental protection industry, environmental industry, and green industry are increasingly studied and applied. Environmental law defines the relevant concepts to adapt to the development of environmental industry, so it is necessary to study the construction and development of its relevant legal system. Green industry and legal research on green industry are the concrete implementation of this concept [7]. Environmental management and corporate social responsibility have become important work improvement focuses, pursuing international standards and developing green industrial system. *Development, testing, and evaluation of green industrial system standards.* The integrated quality management system puts forward the problems existing in environmental management and the methods to solve them. Therefore, the research on green industrial system is helpful for practitioners and researchers to guide the development of green industrial system [8]. In this paper, two new blind watermarking methods for $3D$ mesh targets are proposed. The first method is robust to uniform calibration, and the second method is robust to geometric simplification and mesh simplification attacks. The vertices of the $3D$ mesh object are geometrically deformed. When the pseudorandom watermark signal is projected onto the $3D$ mesh object, the pseudorandom watermark signal is projected without changing the topological structure of the vertices. Embedding the watermark into the target for rotation and translation can ensure the firmness of the watermark for translation and rotation [9]. We propose a practical scheme for copyright protection of electronic watermark images. Here, I will focus on the copyright protection of common pictures taken by cameras. By using robust watermark to extract pre-embedded watermark, the copyright owner of the image is displayed. Besides the picture content itself, it also makes copyright protection possible. Better protection performance can be obtained by using channel coding technology [10]. Some

recent technological changes will reduce the revenue of digital products, while others will reduce the cost of bringing creative works to market. I do not know if copyright protection now provides little incentive for innovation. Over time, its superior quality should lead to an increase in sales and usage, and the index shows that it will increase after that. Researchers and policy makers should pay attention to producer surplus and consumer surplus when considering the degree of copyright protection [11]. In the image watermarking system, the ownership verification does not need the availability of the original image, which solves the copyright protection problem. We are committed to statistical methods to obtain the basic model of decision theory for effective detector structure design. In particular, a statistical description of the original image may not exist. In view of the known and unknown statistical characteristics, different modelling methods are proposed. The watermark can symbolize the information, and the performance of the watermark system is evaluated by the false alarm probability, the detection probability when the watermark exists, and the error probability when extracting the information possessed by the watermark [12]. We have set an optimal level of copyright protection for each producer and the whole society. For a single producer, the best level is no protection, and the gross profit of the producer after deducting development expenses is zero, or completely protected. On the other hand, the optimal degree of society depends largely on the distribution of enterprise development costs. It also shows that the increase of copyright protection may increase or decrease the social welfare loss caused by insufficient utilization of copyright, but the social welfare loss caused by insufficient production of copyright will decrease [13]. This paper discusses the trade-off between knowledge development and exploration activities. The study of mining and exploration activities is not new, and they are regarded as two ends of a continuum. With regard to the evidence that enterprises are faced with in carrying out exploration and mining activities, extensive component reuse and re-engineering programmes have been undertaken to develop new technological innovations and exploration activities within the enterprise, such as the development of professional skills of technicians [14]. At that time, economists and philosophers discussed the rationality of economic planning in market economy, and the concept of tacit knowledge became the key. The foundations of laissez-faire capitalism critically juxtaposed their findings with succinct reviews of management theory and ethnography. We find that the dependence of hidden knowledge as a collective heritage on hidden knowledge is reflected in the theme and trade secrets, so the research results of hidden knowledge need to be protected [15].

2. Description of Green Industry Development under Information Environment

2.1. Necessity of Green Industry Development under Information Environment. The connotation of green industry development is under the information environment. Green

industry development means that green industry institutions consider environmental protection factors when providing green industry services, and provide funding sources for projects that contribute to environmental improvement. The main purpose of green industry development is to guide producers and consumers in the whole society to form a green development concept, guide rational production and consumption, promote the establishment of an environment-friendly and resource-saving society, and, at the same time, continuously develop their own industries. The development of green industry needs the support of various emerging technologies, and the research and development of technology means a large amount of capital investment. The development of green industry has solved the dilemma of general industry development. It reduces the probability of industrial failure caused by financial difficulties, provides financing channels for China's existing green industries, and creates more possibilities for their sources of funds. Flow funds to green industries and related fields so that green industries and projects have enough development funds to better expand their scale. At the same time, developing green industry can also help general industries break through barriers, complete the integration and utilization of internal resources, improve the effectiveness of resource allocation, and help green projects and industries improve efficiency and competitiveness, so as to achieve sustainable and healthy development.

2.2. Requirements for Green Industry Development under Information Environment. Developing green industry is the objective requirement of practising the new development concept in the information age. In the information age, realizing green development and sustainable development is placed in an important strategic position. Green development is also one of the five principles in the new development concept, focusing on solving the problem of harmonious coexistence between humans and nature. People began to realize the importance of green environmental protection gradually, and spontaneous organizations advocating environmental protection came into being to jointly carry out environmental protection actions. In such an environment, the concept of green development has become a development thought recognized and followed by all walks of life, which is inevitable for human society to develop to a certain level. Under the background of the information age, the development of green industry is the concrete embodiment of the objective requirements of practising this development concept, which contributes to China's green development in the field of green finance and provides a steady stream of power for the green economy. We join the green development team with confidence. When these nongreen enterprises begin to attach importance to environmental protection and reduce pollution, they will gradually complete the transformation.

2.3. Development Status of Green Industry under Information Environment. At present, the development of green industry in China is in a relatively preliminary stage. First of all, from the overall scale, the market scale of China's green industry development is constantly expanding, and the overall market demand is constantly stimulated. From the perspective of product types, China's green industry development products are increasingly diversified, but there is still a problem of unbalanced development. At present, some countries in China are still one of the major green bond issuers in the world. Although other products, such as green insurance, started late and accounted for a relatively small proportion in the whole market scale, they have entered the fast lane of development and are developing towards a good trend, promoting the diversified development of China's green industry. Green industry development institutions, especially some banks located in underdeveloped areas in the central and western regions, lack awareness of green finance and have not applied the concept of green development to the whole process of business development. If we do not have a deep understanding of the concept of green industry development products and services, the penetration rate will be very low. This will also lead to the fact that most groups in China do not know enough about the importance of green industries and green projects, and there are few green financial respondents, and the development of green industries in the whole green financial market is not active.

3. Information Green Products Copyright Transaction Processing

3.1. Copyright Transaction Data Range Detection. With the development of copyright transaction management technology, more and more copyright transaction data management systems appear. Usually, the intelligent development and design of copyright transaction data system is realized under B/F interactive framework protocol, and its core is data collection, query, and analysis in copyright transaction data system. The green development of copyright industry lies in promoting the green growth of copyright industry; that is, "green" is the regulation of the specific development mode of copyright industry, and "development" is the goal that the industry must achieve when practising the green concept. We promote the green growth of copyright industry. It is necessary to continuously improve the supply quality of copyright products and services. It is necessary to widely implement green growth management in the industrial system and pay attention to the effectiveness of industrial green growth management. In order to realize the detection of data distribution range, joint time series analysis is adopted to obtain the timestamp proofreading representation of copyright trading system data as follows:

$$x(t) = 1 - \log_2 p(t) \sum_{n=1} a_n. \tag{1}$$

Under the *B/F* interactive architecture protocol, we can focus on monitoring the effectiveness of industrial green growth management and calculating the distribution results of data distribution range, and its function is to promote the green growth of copyright industry and improve the effectiveness of management, promote the development of

green industry towards diversification, and improve the group's understanding of green industry and green projects.

$P(t)$ is the internal frequency of copyright trading system data, e is the timestamp code defining copyright trading system data, t is the time point of receiving data, and a_n is the sample signal in the system. In the structure mapping of fuzzy information, the model network structure is used to compress the data, and the key string representation of the proofread copyright transaction data system is as follows:

$$L = P(t) \sum_{n=1} a_n e \left(\frac{\delta^2 \mu(\theta)}{\log_2 m} + \frac{1+L}{(1-A)} \right). \tag{2}$$

Due to the large scale of interactive big data distribution and poor feature clustering in copyright transaction data system, the query accuracy of interactive big data in copyright transaction data system is not high. Therefore, optimizing the interactive big data query technology of copyright transaction data system is of great significance in improving the management ability of copyright transaction data system. In the formula, δ is heterogeneity, which is the key data buffer memory size of copyright transaction data system, and μ is the similarity coefficient of data characteristics of copyright transaction data system. By using block-matching technology, the range detection expression of interactive big data of copyright transaction data system is obtained as follows:

$$H = \sum_{n=1} a_n e + \frac{\delta^2 \mu(\theta)}{x(t)}. \tag{3}$$

3.2. Feature Extraction of Copyright Transaction Data. It is slightly biased to judge the copyright trading industry as an absolute green product. Based on this, this paper analyses the connotation of the development of copyright trading industry, examines the driving force of the green development of copyright trading industry, and puts forward the development path of copyright trading industry, so as to help the high-quality development of copyright trading industry. B is the frequency of data feature points, and T is the dimension of data feature points. Information matching of copyright transaction data is carried out according to the discriminant result of feature classification attributes, and the entropy of feature classification information is obtained as follows:

$$v = \sqrt{2T} \, \frac{1 + 2(H-A)B}{\log_2 m}. \tag{4}$$

In order to realize the feature extraction of interactive big data information in copyright trading system, according to the classical equivalence relationship between various groups of data in copyright trading system, the representation of feature classification attribute discriminant function of interactive big data in copyright trading system is obtained as follows:

$$I = v \cdot \sqrt{2(\lambda + K)}. \tag{5}$$

The interactive big data query methods of copyright transaction data system mainly include system interactive big data query method based on rough set feature matching, copyright transaction data system interactive big data query method based on similarity feature analysis, and so on. In the formula, K is the power bandwidth of the signal, and h is the characteristic interference coefficient. Considering the balance of the output of the copyright transaction data system, the frequency domain equalization expression of the signal is as follows:

$$D = \sqrt{2(\lambda + K)} \, \frac{\log_2(d+I)}{w}. \tag{6}$$

First of all, we need to consider the output balance of copyright transaction data system, according to the system interactive big data query method of rough set feature matching, the bearing operation of feature interference coefficient is carried out, and the feature extraction of interactive big data information of copyright trading system is realized, and then, the feature matching data in the interactive big data query method of copyright trading data system can be captured.

d is the iteration steps of system query, and w is the interactive big data output bit rate of copyright transaction data system. Based on the steady-state identification technology, the ambiguity function representation of data sampling in copyright transaction data system is as follows:

$$G = \frac{D \cdot \log_2(d+I)}{w} \left(\sum_{k=1} \delta_k d - N \right). \tag{7}$$

First, we need to have the feature interference coefficient obtained from the interactive big data query method of copyright transaction data system. Then, the steady-state frequency domain coefficients are obtained by further operation, and the iterative steps are obtained by querying the copyright transaction data system based on the steady-state frequency domain coefficients so that we can complete the purpose.

R^m is the query response rate of copyright transaction data system, and N is the time-varying rate of tracking channel. The fuzzy features are constrained and controlled, and the modal function representation of the interactive big data feature distribution points of the copyright transaction data system is as follows:

$$M = \sum_{k=1} \delta_k d - N + R^m. \tag{8}$$

First of all, we need to calculate the query response rate of the data of the publishing rights transaction data system. By tracking the time-varying rate of the channel, the fuzzy features are constrained and controlled, and then, the modality of the interactive big data feature distribution points in the copyright transaction data system is analysed. The fuzzy degree of the data in the copyright transaction data system can be reduced by using the feature clustering method when querying the spatial matching degree.

d_i is the access bit rate of the copyright transaction data system; according to the ambiguity function of the copyright

transaction data system, N is the spatial matching degree of the system data query, and the fuzzy feature extraction expression of the interactive big data of the copyright transaction data system is obtained by using the feature clustering method in the database as follows:

$$H(t) = \sum_{k=1} \delta_k d - N + \frac{1}{\Pi} \sum_{i=1} d_i. \tag{9}$$

In order to build a quantitative feature analysis model of interactive big data in copyright transaction data system, the system information is matched according to the joint self-similarity feature of copyright transaction data system. The feature matching coefficient of rough quantization is T. In the classification attribute set, according to the sample training results of copyright transaction data system, the feature clustering threshold of discrete data samples is obtained, and the association matching feature extraction of copyright transaction data system is completed according to the above analysis. According to the similarity characteristics of target samples of copyright transaction data system, the operation training of interactive big data of copyright transaction data system is realized, and the expression is as follows:

$$Z = \frac{1}{\Pi} \sum_{i=1} d_i M + \sum_{n=1} c_n T - H(t). \tag{10}$$

3.3. Optimization of Data Interactive Query in Copyright Trading System.
The big data interactive query network model of copyright transaction data system promotes comprehensive colour transformation and high-quality development. In the new stage, we must follow the basic requirements of saving resources and protecting the environment. By formulating implementation strategies and methods, c_n is an effective data sample of copyright transaction data system and matches the feature mapping parameters of discrete samples. The captured scale information distribution function is expressed as follows:

$$F = \sum_{n=1} c_n T - H(t) + \left[\left(\sigma^2 - p(t) \right) \frac{\theta}{Z} \right]^2. \tag{11}$$

First, we can use the captured scale information and distribution function to query the effective data samples of big data interactive system data and analyse the discrete samples that save resources and protect the environment through the feature extraction and clustering analysis model of big data, so as to obtain the feature mapping parameters of discrete samples.

The above methods all establish feature extraction and cluster analysis models of interactive big data in copyright transaction data system; according to the characteristic distributed fusion and clustering results of interactive big data in copyright transaction data system, the optimized query of interactive big data in copyright transaction data system is realized. However, the data precision of interactive big data query technology in copyright transaction data

system is low, and its accuracy cannot meet the application requirements in this field. θ is the spatial-spectral density of the data distribution of the copyright transaction data system, and the sample information of the copyright transaction data system is comprehensively evaluated and decided, and the depth representation of the obtained output layer is as follows:

$$E = \frac{1}{2\Pi} \left[\left(\sigma^2 - p(t) \right) \frac{\theta}{Z} \right]^2 - \frac{\sin\theta}{2dl}. \tag{12}$$

By establishing the feature extraction and cluster analysis model of copyright transaction data system, after optimizing the interactive data of the system, the preliminary evaluation decision is made according to the distributed accuracy of features, and then, the output layer variable values of the interactive big data of the copyright transaction data system are analysed through the established cluster analysis model, and then, the comprehensive evaluation decision of the system sample information is further put forward to reflect the participation degree.

ϕ is the ambiguity frequency shift of copyright transaction data system. Using joint autocorrelation mapping, according to the fuzzy clustering system of interactive big data in copyright transaction data system, the expression of fuzzy feature matching function is as follows:

$$s = \int_1 \sin \phi^2 d\varphi + \frac{E}{2\Pi} \left[\left(\left(\sigma^2 - p(t) \right) \frac{\theta}{Z} \right) \right]^2. \tag{13}$$

First, we should complete the feature extraction and clustering model analysis of interactive big data in copyright transaction data system, solve the problem of distributed feature fusion and clustering results of interactive big data in the system, and solve the problem of low data precision. According to the spatial-spectral density of distribution, the joint correlation mapping can be extracted.

In any block φ, combined with the matching results of interactive big data of copyright transaction data system, the representation mode of big data interactive query network model of copyright transaction data system is as follows:

$$s(t) = \int_1 \sin \phi^2 d\varphi + \sum_{j=1} Z_j T - \left(\frac{E}{2\Pi} \right)^2. \tag{14}$$

In the network model of query system, the prescribed fusion rules are used for interactive big data fusion of copyright transaction data system, so as to realize interactive query of big data. The convergence control function of interactive big data query in copyright transaction data system is expressed as follows:

$$F(t) = \sum_{j=1} Z_j T + (h - f)^2 - \sin(2\Pi t). \tag{15}$$

3.4. Optimization of Copyright Transaction Data Transmission.
With the development of copyright transaction management technology, more and more copyright transaction data management systems appear. Usually, the

intelligent development and design of copyright transaction data system is realized under B/F interactive framework protocol, and its core is data collection, query, and analysis in copyright transaction data system. h represents the characteristic sampling frequency of the copyright transaction data system, and f represents the information transmission rate of the system data query. Based on this, the window width of the interactive big data transmission of the system is calculated, and the representation is as follows:

$$u_m = \sum_{j=1} Z_j T \sqrt{y + q} - F(t), \tag{16}$$

where F is the time delay of data transmission and q is the hidden node of data transmission. The transmission frequency of interactive big data query data of copyright transaction data system is obtained by adopting adaptive copyright transaction data operation method, which is expressed as follows:

$$\phi = -\frac{\Pi F(t)^2}{\sqrt{y + q}} + \frac{\log_3 \eta + \delta^2}{c + q}. \tag{17}$$

With the development of copyright transaction management technology, more and more data management systems are produced to assist the operation and transaction. B/F interactive framework protocol is needed for data collection and query analysis in copyright transaction data system. Then, the time delay of data transmission and the hidden nodes during data transmission are determined, and the window width based on the information transmission rate of system data query is obtained according to the feasibility of copyright transaction data operation. Without it, the interactive big data transmission of transaction data system cannot be successfully completed.

Using the hidden node of time delay when copyright data are traded, the way of interacting with big data to query data in copyright transaction data system is further improved by using adaptive method, as follows:

$$p(y) = \sum_{n=1, t=1} \mu_n r + \frac{\log_3 \eta + \delta^2}{c + q}. \tag{18}$$

From the gradient error of data transmission, r is the step. Through the method of reconstructing the similarity features of the target sample set, the interactive big data model of the copyright transaction data system is deeply optimized, and the global optimal control function representation of the model is as follows:

$$Y = \sum_{n=1, t=1} \mu_n r + \left[o - p(t) + \frac{p(y)}{2t\Pi} \right]^2. \tag{19}$$

In view of the above problems, this paper puts forward to improve the interactive data query technology of copyright transaction data system. Through the simulation test, we can see that the technology proposed in this paper has superior performance in improving the interactive query ability of big data of copyright transaction data. The path of green development of copyright industry lies in establishing the goal

of industrial development, that is, realizing the green growth of copyright trading industry. μ_n is the step size of adaptive calculation. Finally, the optimal model representation of interactive big data in copyright transaction data system is as follows:

$$F(k) = F(t) + \sum_{n=1, t=1} \mu_n r - p(t). \tag{20}$$

The weights and biases in each layer are updated by backpropagation, and the updated parameters are simulated and practiced in the next cyclic iteration, so as to continuously improve the recognition rate and lose the function in the network model. The weight value w and offset position b in the network model are processed by improving the operation rate, and the specific operation mode expression is as follows:

$$w_2 = w_1 \left(1 - \frac{l\mu}{m} \right) - l \frac{\delta}{\delta w} j(w, b). \tag{21}$$

Keeping the value unchanged, this operation is called one-sided implication. In BS network model, the gradient disappears because of the algorithm linkage differential rules. Solving the activation function brought by continuous multiplication can make the output of some data 0, thus obtaining the interdependence between parameters and effectively alleviating the occurrence of fitting in the process of copyright transaction data. Specifically,

$$b_2 = b_1 - l \frac{\delta}{\delta w} j(w, b). \tag{22}$$

BS network feeds back the classification error to the latest updated parameters of the network model through backpropagation and minimizes the identification loss in the network model through continuous updating iteration. The specific treatment methods are as follows:

$$w_2 = w_1 \left(1 - \frac{l\eta}{m} \right) - l \frac{\partial}{\partial w} J(w, b). \tag{23}$$

In this way, the performance of the model is improved and the time of copyright transaction data processing is shortened. Copyright transaction data are self-enhanced by a coefficient greater than 1, which accelerates the approach speed of the network to the extreme point. As the learning progresses, the model is close to convergence, so at this stage, according to the relative rate of change of the cost function, the calculation rate is appropriately increased or decreased until the network converges or reaches the set number of repetitions. The utilization of the n copyright database can be expressed as follows:

$$b_2 = b_1 - l \frac{\partial}{\partial b} J(w, b),$$

$$l_n = \begin{cases} l_0 \lambda^n, & (1 \le n \le b), \\ l_{n-1}(1 - \alpha(x)), & (n > b \cdot a(x) \ge 0), \\ l_{n-1}(1 - a\alpha(x)), & (n > b \cdot a(x) < 0). \end{cases} \tag{24}$$

4. Copyright Transaction Protection-Related Operations

4.1. Copyright Protection Transaction Data Schema Query. Copyright transaction data query requires high performance of BS network model. If the usage rate of copyright transaction data is too high, the optimal solution will switch back and forth near the extreme point. The operation rate of copyright transaction data is too high, which will lead to local convergence of the optimal solution of the model. It can be seen that the utilization rate of copyright transaction data greatly affects the convergence effect of the network model. In previous experiments, the calculation rate of copyright transaction data in BS network model is mostly set according to experience, which varies greatly in different periods. Therefore, setting the computation rate of copyright transaction data in BS model as a single invariant will have an important impact on the computation performance of the model. Inspired by the adaptive adjustment algorithm, the self-enhancement algorithm of copyright transaction data execution rate proposed in this paper adjusts the execution rate according to the change of copyright transaction data in each stage of the model training process. Compared with uncertain copyright transaction data, the computation enhancement algorithm for copyright transaction data can improve the performance of the model and shorten the computation time. Copyright transaction protection data query requires database-based operations, as shown in Figure 1 below:

With iteration, the recognition accuracy of self-enhancing algorithm for copyright transaction data operation rate has been continuously improved. After reaching a certain level, the accuracy rate remains unchanged and the BS network model converges. Therefore, the algorithm can better reflect the effect of the self-enhancing network model of copyright transaction data operation rate. CIF copyright transaction data set is composed of ten groups of transaction collections, with a total of 70,000 transaction data pieces, each of which contains more than 5,000 variable values. The CI data set model is divided into six training empty fields, each batch contains 60,000 variable values, and the test set is composed of 5,000 variable values randomly selected from a large number of copyright transaction data. Before the model training, the copyright transaction data are processed, the accuracy of the collected transaction data is tested, and the data protection is measured by the coincidence of the data set, as shown in Table 1 below:

The 9500 copyright transaction data collected are used as test data to verify the recognition accuracy of the model. Each sample is a variable value group of 68×68, which is 9 groups of 0 8. Before the BS network model, the samples are normalized. The self-reinforcement algorithm of copyright transaction data operation rate is used as the network model optimization algorithm, with 128 samples in each batch and 30 generations. DPout is introduced in the model training stage to avoid the influence of lamination on experimental results. The BS network model combined with the algorithm is tested in the data set, the data classification degree of the classification results is recorded, and the accuracy of the two groups is repeatedly compared, as shown in Figure 2.

In order to better analyse the classification degree of data classification results in copyright transactions, we need to introduce and eliminate negative useless data generated on the data set in the full connection layer of model training. Classification results of the data repeatedly compared with the accuracy of the test data so that we can better present the copyright transaction data classification results of the data classification degree.

The BS network model of this algorithm has lower effect on CIF data set than benefit network. Compared with HY, RN, and other deep networks, the recognition ability of this algorithm is limited, so there is a certain gap. In the model training stage, the negative data from the experiment on the Alex network model data set are introduced and eliminated in the full connection layer, and the corresponding graphics are made. The collection accuracy and recognition error rate when collecting copyright data on the database while repeating are shown in Table 2.

4.2. Test and Analysis of Copyright Transaction Data. In order to realize the application performance in interactive query of copyright transaction data, the simulation test and analysis of copyright transaction data are carried out, and the operation efficiency of learning different data in the transaction data model is set to be 0.93, the feature matching coefficient is 0.72, the database distribution scale is 2,550 times of operation space, and the sampling interval is 0.37 s. The training data set and test data set of copyright transaction database interaction are shown in Table 3.

According to the above simulation conditions and parameter settings, the interactive big data query technology of copyright transaction data system based on rough set feature matching and the designed technology are used to query the interactive big data of copyright transaction data system, and get the database access throughput comparison test results. According to the database access throughput performance comparison test, the experimental results show that the system response time is faster and the server configuration is higher under the application of the technology designed in this research. Based on this technology and the designed technology, the database access efficiency test is completed, and the transmission rate of each section accessed by the copyright transaction database is shown in Figure 3.

It is very necessary to deal with potential risks. At the same time, we are faced with the problem that the amount of copyright transaction data will be very large in the fluctuation range of transmission rate, but at the same time, it is indispensable that we need to strengthen the detection and protection of data in copyright protection. According to the detection and data encryption, in order to make the protection of copyright transactions more comprehensive, data fusion and joint similarity features can be carried out so that security protection can be in place.

4.3. Transaction Copyright Protection and Risk Management. The security protection of copyright transaction lies in dealing with potential risks. By analysing Figure 3, during
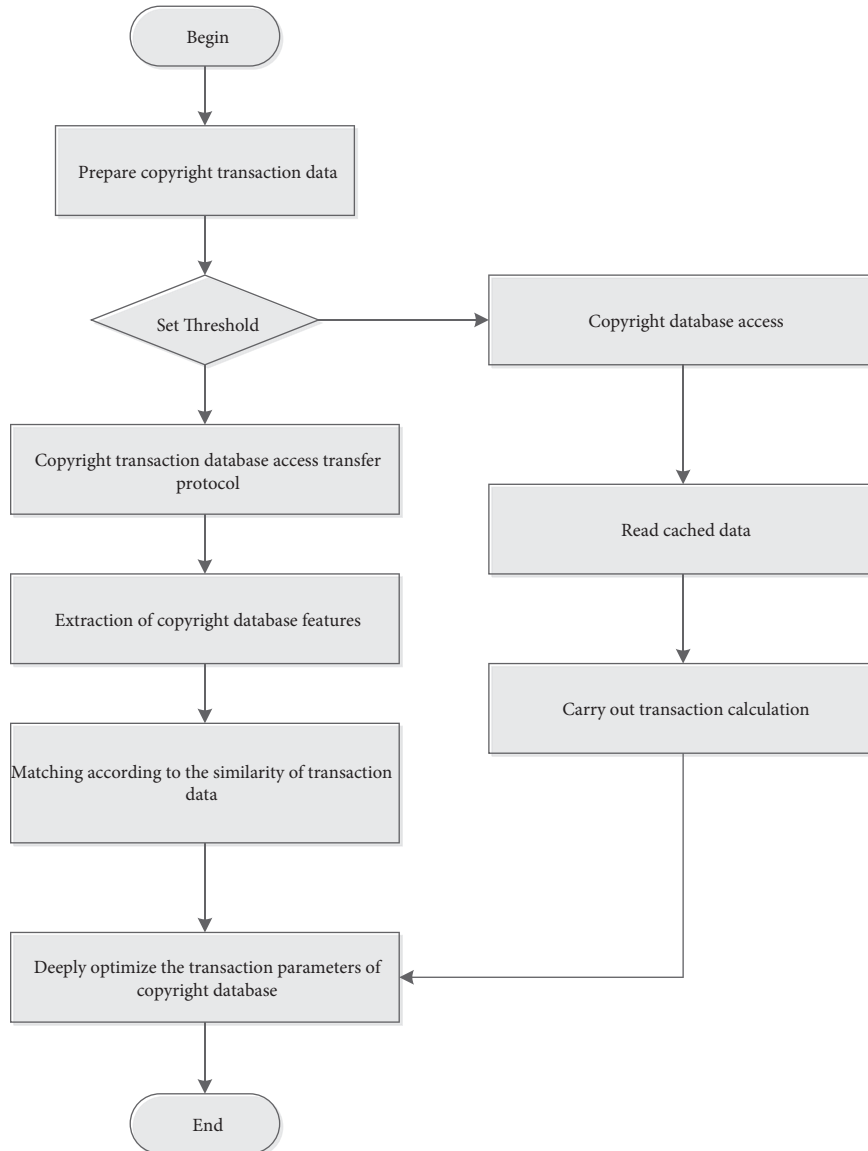
FIGURE 1: Implementation flow chart of copyright transaction data query.

TABLE 1: Identification and protection rate of each method in copyright database.

Model	Accuracy	Data protection rate
K-SVM	79.61	0.236
ResN-20	91.25	0.157
ResN-110	93.57	0.245
KeN	82.18	0.236
INet2010	85.78	0.251
High-19	92.46	0.114
AlexN	87.12	0.336

the experiment, the amount of copyright transaction data will be very large in the fluctuation range of disk transfer rate. The fluctuation range of disk transfer rate in the proposed method is relatively unstable trend edge. It is also indispensable to ensure the security of copyright transaction under the condition that the transmission rate of data query of copyright transaction data is high, the so-called strengthening data detection and protection in copyright protection. Before data transmission, we will first detect and encrypt the transaction data. In order to make the protection of copyright transactions more comprehensive, we will analyse and detect the data during copyright transaction in an all-round way. Once we find abnormal data and any risk matters that threaten the security of copyright transaction, we will upload the problem data for relevant feedback. The specific effect comparison and risk detection of copyright protection methods are shown in Figure 4.

First, we can use functions to map copyright protection data in sample space to a high-dimensional feature space. Then, the information fusion and feature matching of interactive big data in copyright transaction data system are realized by technology combined with similarity feature analysis control method, and the data fusion can solve the problem of inaccurate balance distance results.
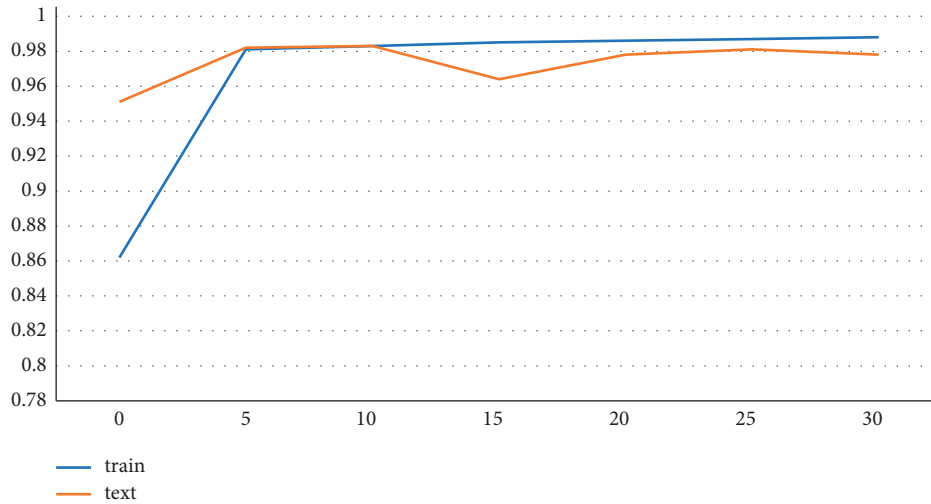
FIGURE 2: Accuracy of copyright transaction data identification algorithm.

TABLE 2: Error rate of data collection on copyright database.

	Space 0	Space 0	Space 0	Space 0	Space 0	Space 0
Train	1.278	0.987	0.812	0.735	0.687	0.612
Text	1.178	0.856	0.634	0.782	0.684	0.524

TABLE 3: Copyright database interactive training test data set.

Training set	Data set size	Test set	Data size
Database component 1	3754	Database component 1	2166
Database component 2	3486	Database component 2	4379
Database component 3	5328	Database component 3	6539
Database component 4	3579	Database component 4	7538
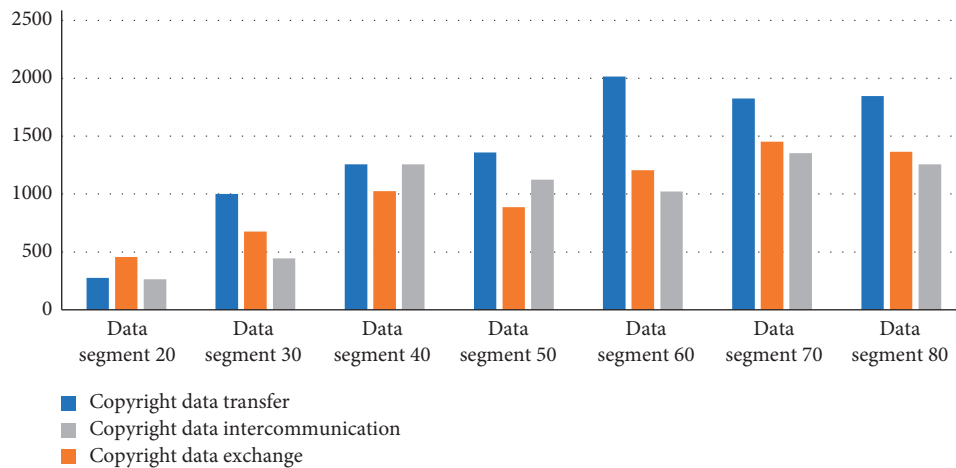
FIGURE 3: Comparison of processing of copyright transaction data at different distances.

In order to prevent the danger of copyright trading and test the precision of interactive big data query of copyright protection system in different methods, analysis of Figure 5 shows that the method we use has a high precision rate for interactive big data query of copyright transaction data system, which plays a good role in copyright protection.

When the maintenance rate reaches over 95% and the output balance is better, the interactive big data access query performance of copyright transaction data system is improved. In order to solve the problem of imprecise query distance and time-consuming caused by copyright protection, a novel clustering algorithm is established, which
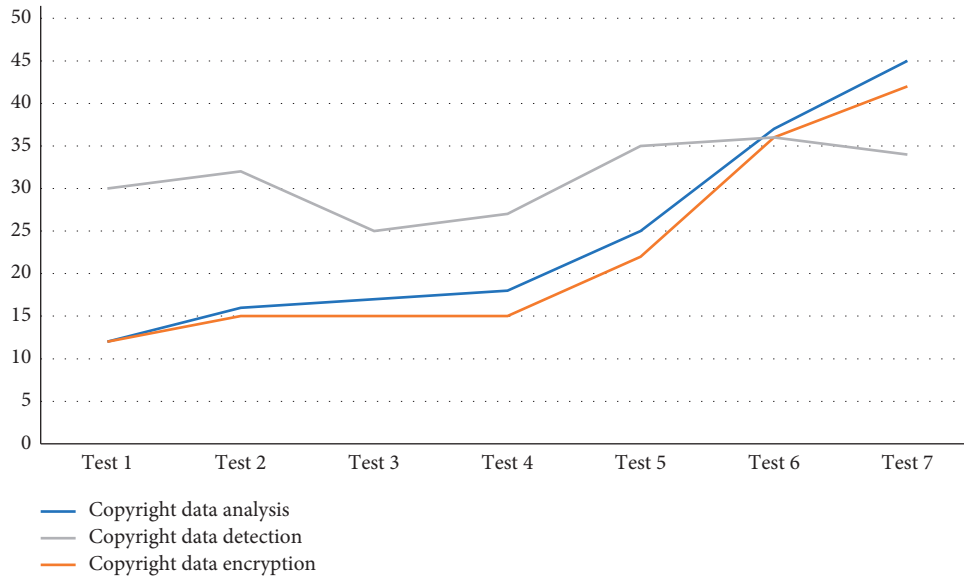
FIGURE 4: Analysis and comparison of copyright transaction protection paths.
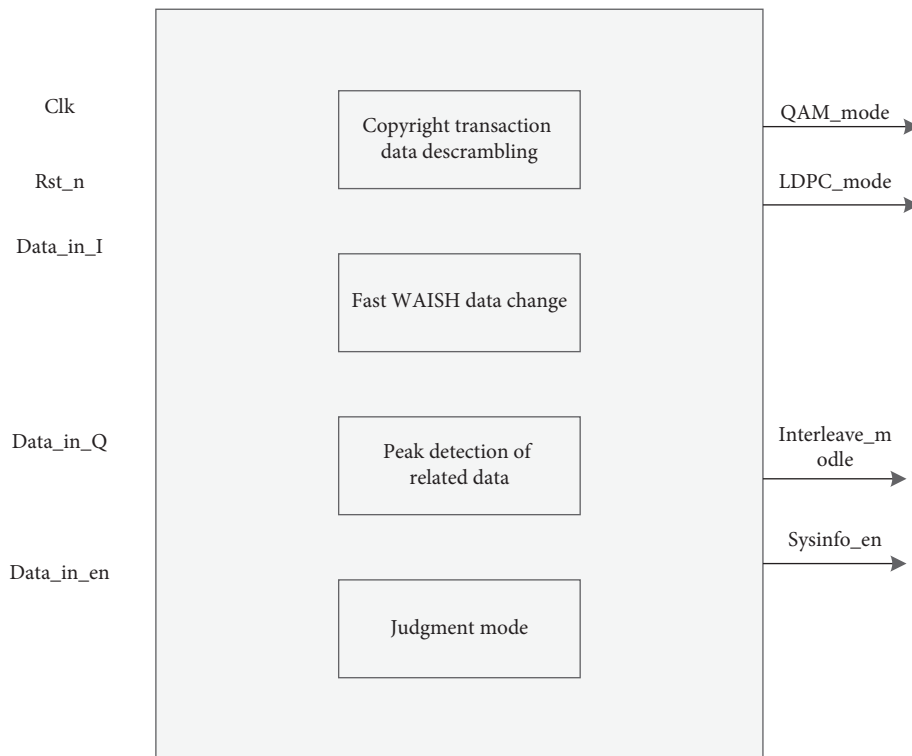
FIGURE 5: Response mode of copyright security change.

maps copyright protection data in sample space to a high-dimensional feature space by using functions. However, this technology ignores the steps of data fusion, which leads to the unsatisfactory interactive query effect and the precision rate cannot meet the requirements of deep processing of big data. The technology proposed in this paper realizes interactive big data information fusion and feature matching of copyright transaction data system through joint self-similarity feature analysis control method. In

order to maintain copyright transaction data in the future, ensure the safety of copyright transaction, achieve ideal application effect, solve the problem of low precision rate, and improve the effect of copyright protection, the copyright data are detected and analysed, and then transferred and maintained. The specific comparison effect is shown in Figure 6.

We should use functions to map copyright protection data in sample space to a high-dimensional feature space and
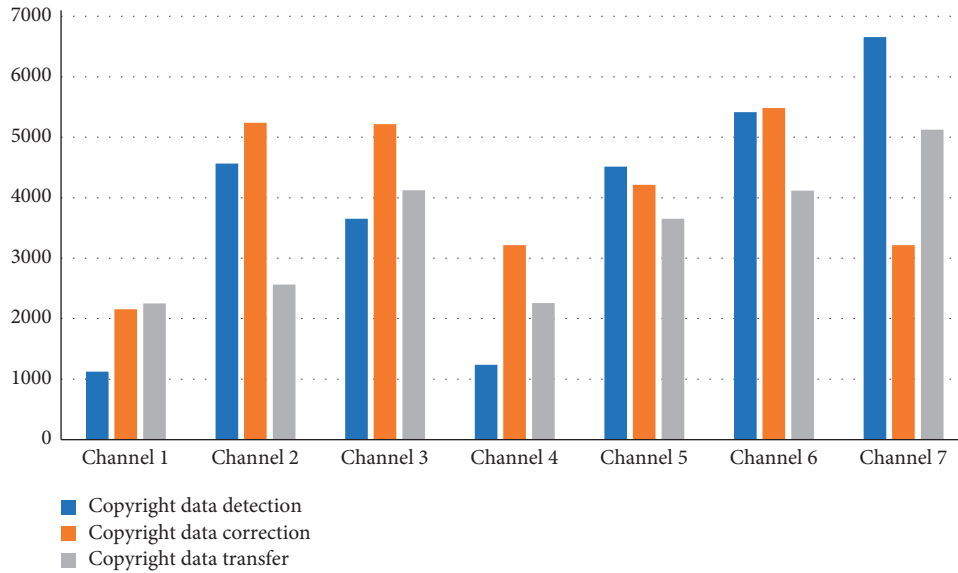
Figure 6: Copyright transaction protection channel test.
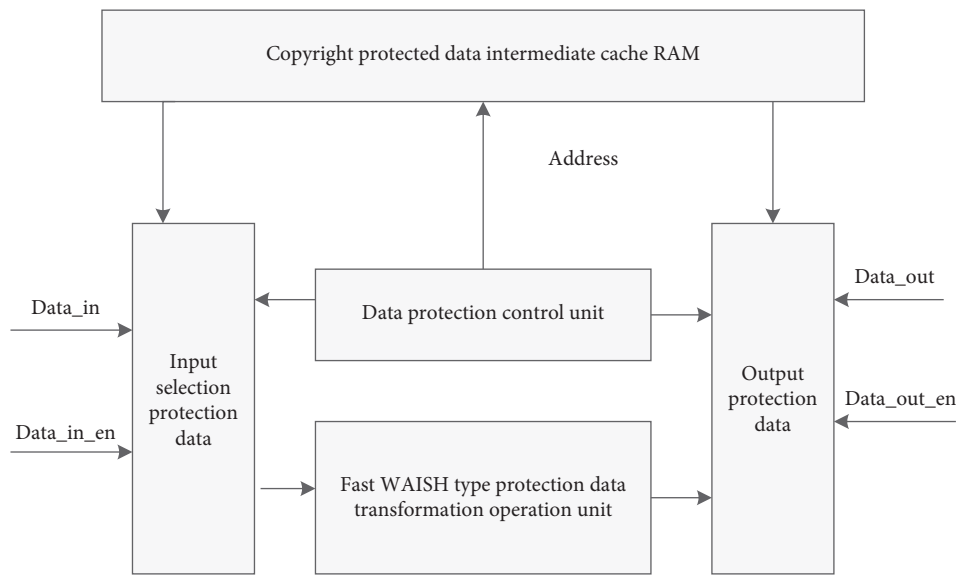
Figure 7: Copyright protection data detection and protection process.

test the precision of copyright protection system in different methods to solve the problem that the precision cannot meet the requirements of deep processing of big data. Analytic control method solves the problem that the interactive query effect of technology is not ideal for big data information fusion and feature matching.

In Figure 5, calk is a copyright data detection system clock signal and stun is a system maintenance data reset signal, which is an extracted copyright protection data information symbol. If the input signal is valid, the input signal notifies the system to start operation. When the analysis meets the judgment condition, the corresponding port is output. Only when the copyright security level in the mode changes, the output signal will judge the security level and

quickly detect the peak value and change type of related data. The specific copyright protection operation flow is shown in Figure 5.

Copyright data protection lies in realizing high-speed Walsh conversion. Under the condition of satisfying the system timing requirement, a minimum high-speed Walsh operation module is reused 262 times, which can greatly save the consumption of resources. An implementation block diagram of the high-speed Walsh conversion includes a control unit, an input/output selection unit, a calculation unit, and an intermediate cache RAM unit. The management of copyright transaction data plays a vital role in copyright protection. The specific discovery protection and migration process is shown in Figure 7.

5. Concluding Remarks

This paper deeply analyses the development and trading mode of copyright industry under the background of Informa ionization. How to make the copyright transaction in the context of information security transactions and transfer, and how to protect the security of copyright transactions, we put forward in the context of information security processing, according to the BS network model better reflect the copyright transaction data operation rate self-enhanced network model effect. Starting from the data analysis and detection of copyright transaction database, and detecting and encrypting the transaction data before data transmission can make the protection of copyright transaction more comprehensive. The data query of copyright transaction protection needs to be based on the operation of database. Therefore, the CIF copyright transaction data set and CI data set we use provide us with great support for copyright protection in operability. The comprehensive use of these methods and set model also makes us more effective in using copyright transaction data and more comprehensive in copyright transaction protection.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest regarding this work.

Acknowledgments

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Retraction

Retracted: On the Ways of Political Philosophy Innovation and Popularization under the Network Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] Y. Ma and Q. Li, "On the Ways of Political Philosophy Innovation and Popularization under the Network Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 2201497, 9 pages, 2022.

Research Article

On the Ways of Political Philosophy Innovation and Popularization under the Network Environment

Yan Ma [1] **and Qi Li** [2]

[1]*Jilin University, Changchun 130024, Jilin, China*
[2]*Northeast Normal University, Changchun 130024, Jilin, China*

Correspondence should be addressed to Yan Ma; yanma18@mails.jlu.edu.cn

From the perspective of comprehensive modernization, the Sinicization and modernization of Marxism are inseparable from the popularization of Marxism, which will promote the Sinicization and modernization of Marxism and make it more practical and vital. Time has changed, and the traditional ways and methods have faced a new pattern, but they still contain the practical value worth exploring and give full play to the contemporary function of beneficial historical experience. On the basis of drawing on historical experience, we follow the idea of establishing basic principles, focusing on important ways and looking for the development prospects, and discuss the discussion layer by layer in clear guidance, grasping the key points and thinking about the future. In today's era, with the development of the network, the popularization of Marxist philosophy has ushered in a period of opportunity for development, but at the same time, the development has also encountered some challenges. Based on the actual situation of contemporary China, in recent years, the popularization of Marxism has made great achievements, but it also presents the phenomenon of unbalanced overall development, low operation efficiency, and uneven cooling between the officials and the people. Under these conditions, popularizing network knowledge, developing network culture, improving relevant laws, and making its theories more popular are all important ways to realize the popularization of Marxist philosophy. The research on the popularization of Marxism and the academic level is more profound, while the practical practice is more lacking. In order to correct the bias of emphasizing science and theory, it is of strong practical significance to conduct in-depth theoretical research and practical discussion from the perspective of "ways and methods."

1. Introduction

Since the reform and opening up, an important change in many areas of social life is the rapid development and wide application of network technology [1]. Since the beginning of the development of network technology, it has affected all aspects of people's lives, not only profoundly changing the way of modern information dissemination, but also making earth-shaking changes in people's way of life and communication, becoming an indispensable part of modern people's life. From a global perspective, network technology is generally manifested through TV forms, mobile phone forms, and network forms. It has the characteristics of openness, interactivity, diversity, and immediacy, which can meet our various needs such as learning, communication, and entertainment. It has gradually become an important platform for us to obtain various information and interpersonal communication, and it has become a new way of life and social development trend. The main purpose of the network environment is to allow humans to understand the world from representation to ontology, as shown in Figure 1 [2]. The cognition and cultivation of political consciousness are inseparable from human perception of the relationship between nature, environment, and human society. The change of environment has a great impact on psychology. At the same time, it also has a profound impact on the establishment of values and philosophy. The change of natural environment also has an impact on human's ability to recognize and build the world. The idea of building an intelligent society also comes from the perception of the natural environment.
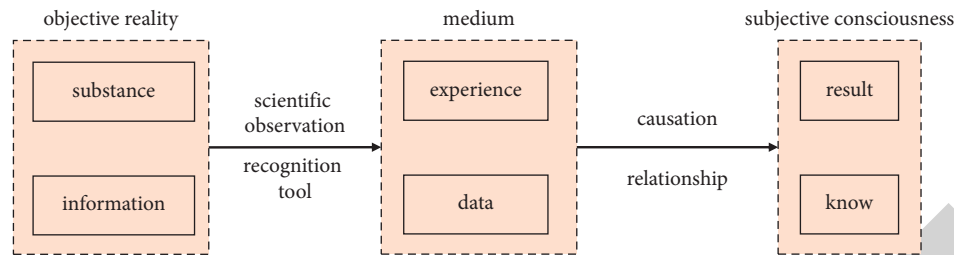
Figure 1: The existence and consciousness formation of the network environment.

In October 2009, the Fourth Plenary Session of the Seventeenth Central Committee of the Communist Party of China required the whole party to "continuously promote the Sinicization, modernization and popularization of political philosophy Marxism" [3]. In June 2015, Liu Yunshan pointed out at the Symposium on Marxist Theory Research and Construction Engineering Work that "improve theoretical consciousness, highlight the main direction of attack, strengthen problem orientation, lead engineering work in depth, and better promote the Chineseization of Marxism and the popularization of the times." This not only is a requirement and expectation for the implementation of the "horse project," but also has general guiding significance [4]. In May 2016, Xi Jinping pointed out in his speech at the Symposium on Philosophy and Social Science that "an important task of my country's philosophy and social sciences is to continue to promote the Sinicization, modernization and popularization of Marxism, and continue to develop Marxism in the 21st century, contemporary Chinese Marxism." In this context, a systematic and in-depth study of the ways and methods to promote the popularization of contemporary Chinese Marxism has important theoretical and practical significance [5].

The popularization of Marxism is a scientific proposition and a historical task related to the Marxist theory and the future and destiny of Chinese social development, and is a fundamental project to strengthen the construction of socialist ideology. Xi Jinping pointed out that "Marxism is an open theoretical system that develops with the development of the times, practice and science [6]. It does not end the truth, but opens up the road to the truth." The specific content of Marxism is shown in Table 1. The language is clear, and it is explained in a way that the masses like to hear, so that it can be better understood and accepted by the majority of party members and the masses [7]. At the same time, Xi Jinping attaches great importance to the distinctive characteristics of the times and practical significance brought about by the progress of science and technology, emphasizing "using the Internet and big data technology to strengthen the infrastructure and informatization construction of philosophy and social sciences" [8]. We should make comprehensive use of the data resources mastered by all aspects, strengthen big data mining and analysis, and promote the popularization of Marxist philosophy through network technology.

By analyzing the connotation of the popularization of the Marxism theory, this article understands the current situation and problems of the popularization of Marxism, and puts forward corresponding suggestions and strategies for the main existing problems.

2. Theoretical Research

2.1. Political Philosophy: The Connotation of the Popularization of Marxism. From the perspective of affiliation, the popularization of Marxism is an important component of the "three modernizations" of Marxism as an organic whole, and it is a part of the "three modernizations" of Marxism [9]. The three modernizations of Marxism mainly include sinicization, popularization, and modernization. Analysis from a multidimensional perspective is helpful to fully grasp the rich connotation of the popularization of Marxism [10]. For example, based on the theoretical perspective, some scholars believe that the popularization of Marxism consists of three aspects: Marxism "popularization," Marxism "popularization," and popularization of Marxism. Based on the related perspective of the "three modernizations," some scholars have proposed that the sinicization of Marxism has become the theoretical premise and principle requirement of the popularization of Marxism, and the popularization of Marxism is the social cornerstone and mass foundation of the sinicization of Marxism. The two have their own emphasis and are closely related, forming a set of benign interactive relationships [11].

2.2. Political Philosophy: The Subject Analysis of the Popularization of Marxism. The popularization of Marxism consists of three main subjects, namely, the main body of organization and leadership, the main body of communication and transmission, and the main body of practice and acceptance [12]. The Communist Party of China, as the main body of leadership, occupies the core position in the main body system and is the leading force, backbone, and core pillar to promote the popularization of Marxism and all higher-level party committees [13]. The main body of communication and transmission of the popularization of Marxism occupies the position of undertaking and implementation in the main system, and plays the role of teaching and conveying, including propaganda departments, theoretical research institutions, party schools and administrative colleges, national education institutions, and government policy research [14]. Departments, mainstream media, mass organizations, etc., from the perspective of objects, include theoretical propaganda workers, experts and scholars, and state civil servants. The effectiveness of the

TABLE 1: Basic theory of Markism.

Gist	Specific contents	
Meaning of Marxism	From the knowledge achievements of creators and inheritors	Marxism is a scientific theoretical system of viewpoints and theories founded by Marx and Engels and continuously enriched and developed by their successors.
	In terms of class attributes	Marxism is a theory about the emancipation of the proletariat, the emancipation of all mankind, and the free and all-round development of everyone.
	From the research object and main content	Marxism is the scientific world outlook and methodology of the proletariat, a theory about the general laws of the development of nature, society and human thinking, and a theory about the inevitable replacement of capitalism by socialism and the ultimate realization of communism.
The basic composition and main content of Marxism	①Three basic components—Marxist philosophy, Marxist political economy, and scientific socialism, which are organically unified and together constitute the main content of the Marxist theory. ②Others: It also includes many other fields of knowledge such as history, political science, law, culture, journalism, and military science and continues to enrich with the development of practice and science.	
Fundamentals of Marxism	Basic position	The basic standpoint of Marxism is the fundamental standpoint and starting point for Marxism to observe, analyze, and solve problems, that is, to take the liberation of the proletariat and the liberation of all mankind as its own responsibility, to take the free and all-round development of human beings as its beautiful goal, and to take the people as the center, everything is for the people, and it depends on the public.

TABLE 2: The evaluation index system of the communication effectiveness of the popularization of Marxism.

Evaluation object	Evaluation indicators		
	First-level indicator	Secondary indicators	Three-level indicator
The effectiveness of the popularization of Marxism	Audience capability	Insight	Timely perception of changes at the ideological level
		Judgment	Judgment about the situation
			Definition of position
		Thinking ability	Using basic theories to analyze changes in reality
		Creativity	Innovation in theory in the learning process
			Innovation in behavior in practice
	Audience attitude	Cognitive attitude	Proactively seek supportive information
			Selectively accept new perspectives
		Spiritual will	Happy spirit
			Strong-willed
	Audience behavior	Individual behavior	Regulate personal behavior
			Guide the behavior of other individuals
		Group behavior	Common values enhance team awareness
			Fully implement the socialist core value system
		Social behavior	Full implementation of the socialist concept of honor and disgrace

popularization of Marxism can be evaluated through Table 2. The mass of the people is the main body of practice and acceptance of the popularization of Marxism, and occupies a fundamental position in the subject system. To sum up, the "three major subjects" of Marxism popularization occupy different positions and play different roles in the subject system. They not only support each other, cohere and integrate, but also play their respective advantages. Changes have an extremely important impact [15].

2.3. Political Philosophy: Characteristics of the Popularization of Marxism.
The popularization of Marxism in colleges and universities first has the universal characteristics of the

popularization of Marxism, such as scientific, practical, epochal, and long term, as shown in Table 3. (1) Scientific: the scientific features of the popularization of Marxism are manifested in three aspects [16]. First, it shows the scientific nature of the Marxist theory. Based on its scientifically revealing the laws of thought and movement in nature, society, and people, and through repeated practice over a long period of time, Marxism has been proved to be a scientific theoretical system, and it has also made it active on the historical stage for a long time, enduring and maintaining youthfulness. (2) vitality: the scientific nature of the Marxist theory is the premise of guaranteeing its popular scientific nature.

Second, practicality. The practical features of the popularization of Marxism are manifested in two aspects. On the

TABLE 3: Characteristics of the popularization of Marxism.

Gist	Specific contents
Wholeness	① it is the overall reflection of the three interrelated principles of Marxism to the objective world, people's cognition, people themselves, and the regularity of the development of human society. ②It is an overall study of the logical relationship between different levels of the objective world, human cognition, human self, and the development of human society.
Epoch	① It is necessary to adhere to and develop the basic principles of Marxism on the basis of understanding the connotation of the times, grasping the characteristics of the times, and reflecting the requirements of the times. ②Lead the times with the developing basic principles of Marxism.
Scientific and ideological	①It is the most revolutionary and scientific world outlook, methodology, and ideological theory system in the world so far, and it is an ideological weapon for people to understand the world, transform the world, and improve themselves. ② It not only explains the world, but more importantly, it transforms the world. The basic principles of Marxism are the spiritual weapons of the proletariat and the theoretical basis of the proletarian party and its program, strategy, and tactics. ③ It shows strong criticality and militancy. On the one hand, it has to fight back against attacks from the bourgeoisie; on the other hand, it has to fight against the wrong ideological trend of area code Marxism from within Marxism.

one hand, Marxism is a practical science. The popularization of Marxism is not a slogan, but a real practical practice [14]. It is necessary to implement the work of the Marxist theory from abstract to concrete, from esoteric to popular to Marxist theorists and ideological and political educators, and to effectively implement Marxist theory propaganda and education in all aspects of social life (Figure 2). It shows the acceptance degree of the masses before and after the popularization of Marxist philosophy. As can be seen from the figure, before 2010, the popularization of Marxism was more accepted by the masses. After 2010, due to various problems in the popularization of Marxism, the effect of the popularization of Marxism gradually decreased.

(3) The times: the epochal characteristics of the popularization of Marxism are manifested in two aspects. First, Marxism keeps pace with the times. Marxism is a scientific revelation of the laws of movement of nature, society, and human thinking. Keeping pace with the times is the scientific quality of Marxism. Marxism develops continuously with the development of the times, practice, and science and always moves forward with the pace of the times [17]. Second, the methods of popularization of Marxism are of the times. It is necessary to use the current discourse system to interpret Marxism, to use new technologies and new methods to publicize and educate Marxism, so that the popularization of Marxism will always maintain a fresh power.

Fourth, long-term. The long-term nature of the popularization of Marxism is manifested in two aspects. First, the popularization of Marxism is a systematic project. The popularization of Marxism is not only limited to a small number of party members and cadres, but also to make the general public have specific cognition, emotional recognition, and guidance for Marxism [18]. From these perspectives, it is a systematic and complex project with continuous sex and long-term. Second, the popularization of Marxism is essentially an ideological activity, which also determines its complexity and long-term nature. Human thought has the characteristics of complexity and concealment. Only through long-term and continuous publicity and education

can a person's thinking be changed. Coupled with the theoretical, esoteric, and boring nature of Marxist theory itself, the popularization of Marxism is a long-term process [19].

3. Challenges to the Popularization of Marxism by the Internet Environment and Analysis of Current Situation

3.1. The Challenge of the Network Environment to the Popularization of Marxism. The diversification of network information has triggered a crisis of people's beliefs. Judging from the characteristics of network media itself, it is inclusive and open, and various cultures can be exchanged and spread on the network. When different cultures communicate with each other, there will be theories of different viewpoints. Various ideas and viewpoints emerge in an endless stream, which brings new challenges to the popularization of our Marxist philosophy. Some capitalist countries have controlled the right to speak to a certain extent by virtue of their strong material and technological advantages. At the same time, due to the openness of the Internet itself, people who conduct cultural exchanges on the Internet may come from different countries and regions, and have different ideological viewpoints, some of which are negative. These will also have a certain impact on people's beliefs and even lead to people's belief crisis, which is undoubtedly a huge challenge for the realization of the popularization of Marxist philosophy. At present, the public can accept the road to popularization of Marxism, as shown in Figure 3.

The complexity of network information has weakened the dominance of the Marxist philosophical theory. Due to the characteristics of the network itself, the people have full autonomy on the network. As a theory, the dissemination of Marxist philosophy in the network environment will inevitably encounter doubts. In addition, the audience of the Internet is complex: it includes people of all classes and fields with different values. Some of them may be genuine learners
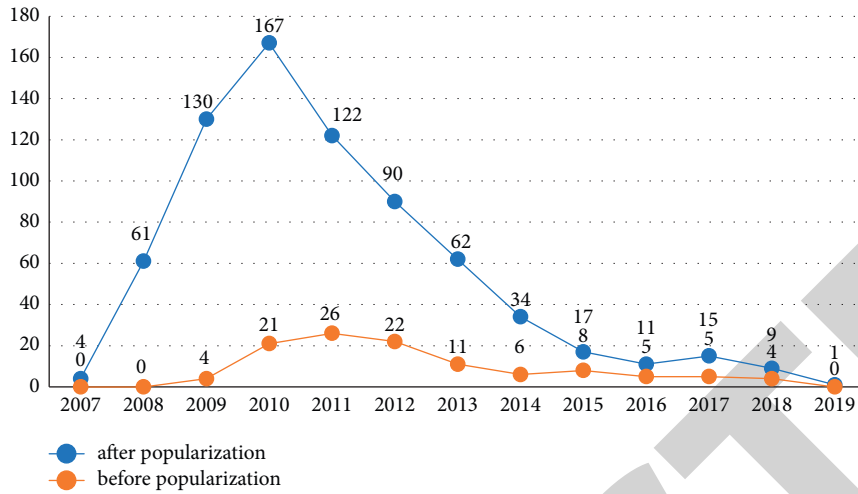
FIGURE 2: Comparison of the acceptance of the masses before and after the popularization of Marxist philosophy.
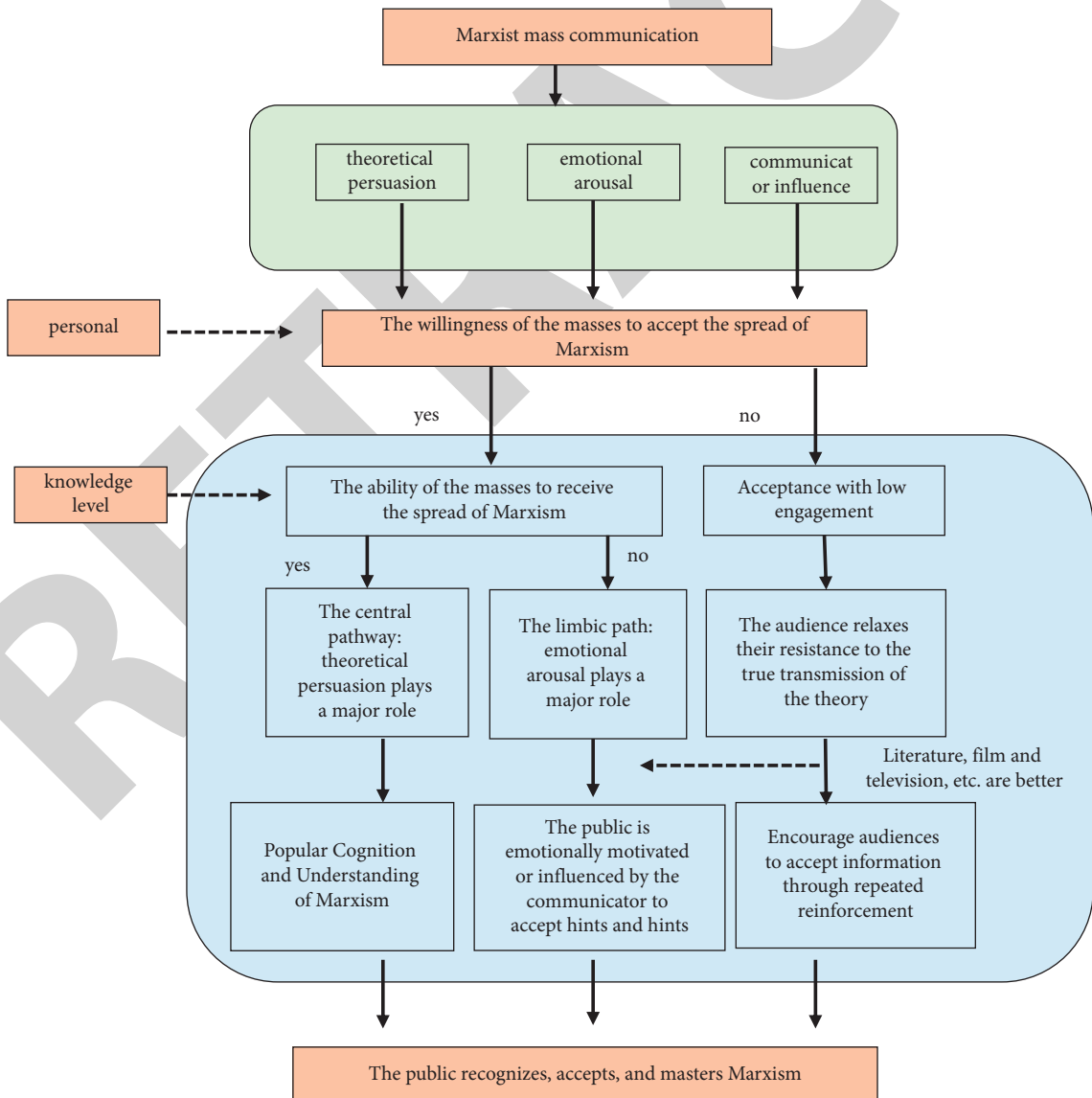
FIGURE 3: The role path of the public accepting the popularization of Marxism.

Educational structure of netizens in my country as of March 2020
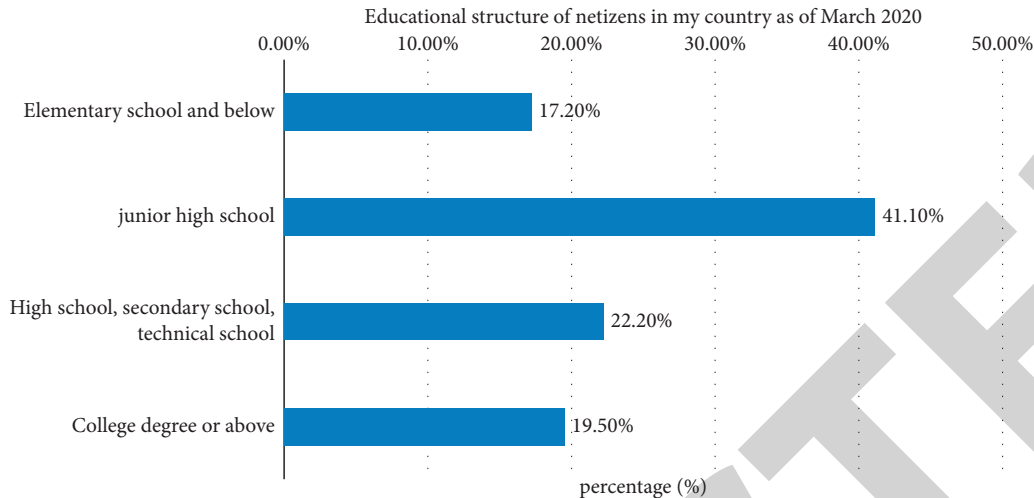
FIGURE 4: Distribution of educational background of netizens in my country.

who want to delve into Marxist philosophy, while others may be hostile elements who deliberately attack Marxist philosophy to promote other ideologies. In such a complex network environment, various cultural theories are swarming, and at the same time, various evaluations of Marxist philosophical theories are constantly appearing, which also has some adverse effects on the leading role of Marxist philosophical theories.

The low education of netizens has affected the spread of Marxist theory. In the network environment, the process of information dissemination is more difficult to control than in the past. This is mainly because, in the past, when disseminating information, it was mainly spread through some tools that the government can control. Through the network, everyone can quickly disseminate information and master the information. In this way, the government's grasp of information will inevitably decrease, and the speed and process of information dissemination will be more difficult to grasp. The survey shows that among Chinese netizens, the proportion of people with relatively low education and relatively young age is increasing, as shown in Figures 4 and 5. It can be seen that the phenomenon of low education and younger online audience is more and more obvious. The education of Chinese netizens is mainly junior high school, while the age of netizens is mainly 18–24 years old. Compared with those with higher education and older age, these people with lower education and younger people lack the ability to discriminate and process information under Internet conditions and are more likely to be affected by some negative and unhealthy information on the Internet affected. From this point of view, under this condition, how to improve the cultural level and age distribution of netizens is also an issue that cannot be ignored.

3.2. The Status Quo of the Popularization of Marxism

3.2.1. "Large Differences and Unbalanced Development" and Its Causes. The popularization of Marxism has the phenomenon of imbalance among groups, fields, and regions.

Classified according to the audience group, in terms of the effect of popularizing Marxism, party members and cadres, especially leading cadres, are better than ordinary party members, CCP members are better than ordinary people, theoretical workers are better than nontheoretical workers, and young students and intellectuals are better than cultural ones. Low-level grass-roots workers and peasants; in terms of geographical distinction, cities are better than villages, and ethnic minority autonomous regions and ethnic minority settlements are inferior to nonethnic autonomous regions or settlements. The reasons for the above differences are as follows: first, the theoretical basis, interest, learning ability, comprehension and acceptance ability of the main audience due to academic qualifications, cultural theoretical literacy, etc. Caused by factors of orientation and political identity, such as differences in theoretical interest and whether or not party membership is formed, some are hungry and thirsty for theoretical learning, some are indifferent and absent, and some are tepid in theoretical learning. The attitude of fire and lukewarmness; the third is the influence of the environmental atmosphere, and the surrounding large environment and small environment can exert positive or negative influence. "In the fluffy hemp, it is straight and straight, the white sand is in Nirvana, and it is dark with it." The more opportunities you can enjoy, higher the level of theoretical education, such as high-level academic lectures; ordinary people will not be able to listen to them; fifth, factors such as religious beliefs play a role, such as in areas where ethnic minorities live, and some people already believe in Tibetan Buddhism. For such groups, under the premise of respecting their freedom of religious belief, persuading them to accept and accept Marxist theory will naturally add and increase the difficulty of education and guidance.

3.2.2. Emphasis on Form and Low Efficiency and Its Causes. On the one hand, the level of attention is not enough, and the phenomenon of formalism is common. On the surface, it is "vigorous" and "very powerful," but in essence, it is
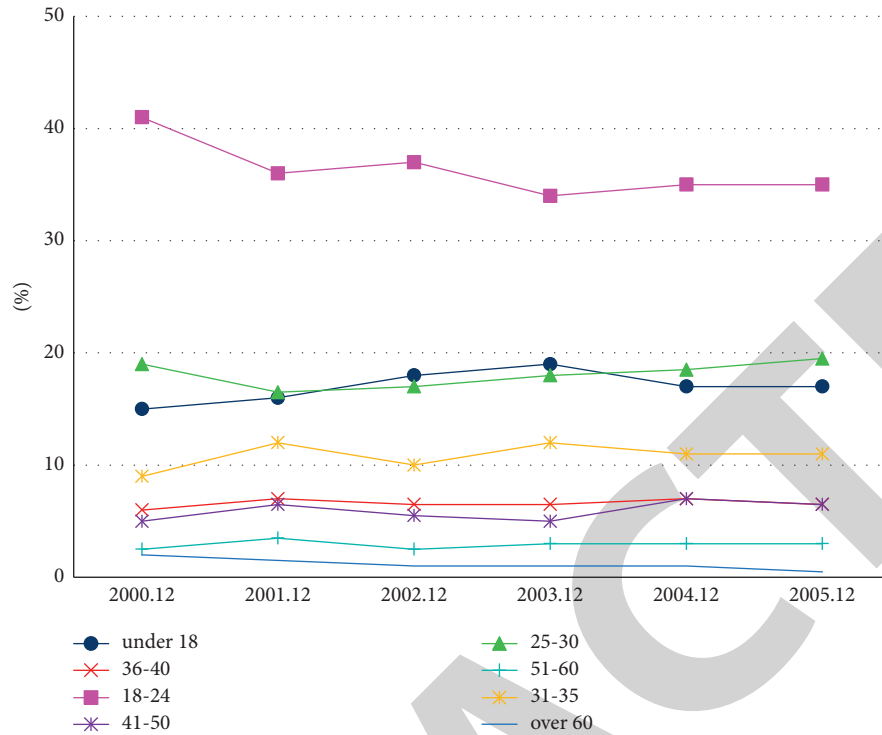
Figure 5: The age structure distribution of Chinese netizens.

superficial but not deep, pursuing form rather than effect. The whole shows the characteristics of "superficial, floating, empty, empty, scattered, bulky, slow," and so on. The theoretical study and propaganda of some organs and units are mere formalities, staying at the completion of higher-level tasks and coping with higher-level inspections, and only content with writing summary materials and doing work reports. The staff engaged in the propaganda of the Marxist theory in the grass-roots communities and the vast rural areas have multiple jobs, their energy is scattered, and they are even useless. The phenomenon of "emphasizing wisdom and neglecting morality" in middle school and primary school education is ubiquitous and ubiquitous. On the other hand, due to the lack of support from a favorable environment, the inherent vitality of the various structural elements of the popularization of Marxism cannot be well stimulated. As a result, the popularization of Marxism between the subject and the object, the subject and the mediator, the subject and the object and the ring body avoids unnecessary internal friction and forms a pattern of integration, interaction, and coordinated development, and then breaks through the "obstruction" of low efficiency and low efficiency, bottleneck, which is the countermeasure we should take promptly and decisively. In order to study the specific effect of the popularization of Marxism, we can refer to the path shown in Figure 6 for analysis.

3.2.3. "Hot on the Top and Cold on the Bottom, Officials Hot, and People Cold" and Its Causes. There is a gap between the degree of attention and public participation in the popularization of Marxism and the expected goal. From the top,

the "high-level" method of preaching even made some high-level intellectuals unwilling to accept it, resulting in a certain degree of rejection; from the bottom, a considerable number of people felt that "the truth is correct, it sounds boring, and it's useless in life." The reasons for this are the academicization of research, the high coldness of discourse, the niche content, the Westernization of rationale, and the promotion of peddling. "Research into a school" is manifested as follows: some experts and scholars bury their heads in the pile of old papers, and these scholars ignore reality, "hide in learning and become unified," that are keen on pure academic Marxist research, and are addicted to studying Marxism with learning discourse logic. The results are separated from actual work, from social reality, and from the actual needs of the people. As a result, there is a misunderstanding of lack of problem orientation, abandonment of realistic tendencies, and separation from the value orientation of the people. The "coldness of discourse" is manifested in the following research paradigms, such as tinkering with classic theories, or seeking out chapters and excerpts, and making small and righteous words. The result of using these arrogant and ungrounded languages can only make the people feel that Marxism is "invincible at heights" and then look at the literature and stay away from it. "Content niche" is manifested as follows: in order to highlight the so-called "innovation," difficult, uncommon, and marginalized topics are chosen, only a few people pay attention, and there is a lack of echoes from the general public. "Westernization of rationale" is manifested as follows: using the concept of "words must be called Greece," preferring to borrow and apply Western theories to interpret Marxism far-fetched. "Propaganda and peddling" is
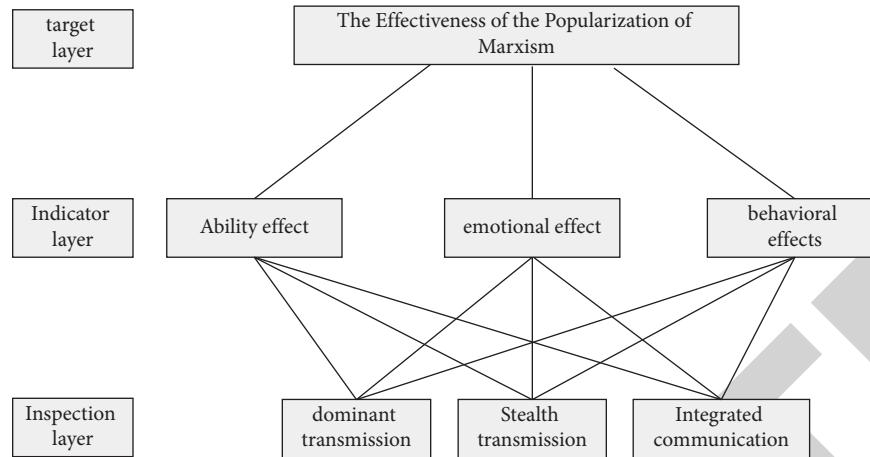
FIGURE 6: Hierarchical structure of the evaluation of the effectiveness of Marxist popular communication.

manifested as follows: not paying attention to guidance, adopting one-way indoctrination. In a word, the research style, form, content, argumentation, and propaganda methods have created a great gap between the public and the Marxist theory, the asymmetry of the upper and lower heat.

4. Analysis of the Ways to Promote the Popularization of Marxist Philosophy under the Network Environment

4.1. Strengthen the Construction of Network Service Facilities, Improve the Ability to Use the Network, and Promote Marxist Philosophy to be Recognized by More People. Our country started late in the construction of network service facilities and is relatively backward. Therefore, with the continuous development of my country's reform and opening up, many aspects of the country have also achieved certain achievements. In this regard, our country should see our deficiencies in network information technology and strengthen the development in this area, especially the network construction in some relatively poor areas. The inability to access the Internet accounts for a larger proportion. It is necessary to pay attention to the popularization of computer knowledge and network knowledge for these groups, strengthen the ability to use the Internet to spread Marxist philosophy, and then promote the penetration of Marxist philosophy to a wider group.

4.2. Use the Internet to Transform Abstract Theories into Easy-to-Understand Theories and Make Theories More Popular. In the process of promoting the popularization of Marxist philosophy, theoretical viewpoints and methods of dissemination of Marxist philosophy can be recognized by the people, which plays an important role in the smooth realization of the popularization of Marxist philosophy. Therefore, in the network environment, Marxist philosophy itself also needs to be optimized. Marxist philosophy can be expressed in speculative language, but it can only be communicated in popular language. Today, with the

development of the Internet, we must proceed from the characteristics of the current era, change the original method of disseminating theories, and transform the boring and difficult theories into easy-to-understand readers, so that the theories are easier to understand.

4.3. Improve the Quality of Netizens and Optimize the Audience. In the process of popularization of Marxist philosophy, it is particularly important to improve the quality of netizens. In the process of popularizing Marxist philosophy, we must spread it in a way that is easy for the people to understand, so as to be accepted and mastered by the people. However, if the quality of netizens in our country is still relatively low and the cultural level is relatively low, then the understanding of Marxist philosophy and its ability to apply it will also have a certain impact. Therefore, it is also extremely important to continuously improve the quality of netizens and further optimize the audience for the popularization of Marxist philosophy.

5. Conclusion

Marxist philosophy is part of Marxism. The popularization of Marxism means that by holding some publicity activities about its theory, the basic theory of Marxism can be easier to understand, easier to be learned and used by the people, so that it can guide people's daily activities and then guide people. People rightly make changes to the world. Since Marxist philosophy belongs to one aspect of the Marxist theory, the meaning of its popularization has something in common with that of Marxism to a certain extent. Many people will think that Marxist philosophy is boring and just empty grand theory, which has no substantive effect on our actual life, and there is no need to study. In order to change this phenomenon, we must vigorously promote the process of popularization of Marxist philosophy. Based on the development of network technology and the characteristics of the network environment, promoting the popularization of Marxist philosophy has important practical significance for improving the quality and belief of our nation.

Research Article

Feasibility Analysis of Mutual Benefit Cooperation between Environment-Embedded Art Design Education and Local SMEs Development Based on Improved Grey Analysis

Wei Miao[1] and Honghui Zhou [ID][2]

[1]School of Textile Garment and Design, Changshu Institute of Technology, Changshu 215500, China
[2]College of Materials Science and Engineering, Northeast Forestry University, Harbin 150040, China

Correspondence should be addressed to Honghui Zhou; zhh1146@nefu.edu.cn

With the continuous progress of the economic era, both art and design education and local small and medium-sized enterprises are facing the crisis of survival and the pressure of competition, forcing the two to join hands to resist this crisis. The protection of the ecological environment will not only affect people's lives, but also affect the design and creation of art. This paper adopts the methods of correlation degree and correlation coefficient to construct a feasibility analysis model of mutual benefit cooperation between environment-embedded art and design education and local SMEs development based on improved grey analysis. It is to help art and design education and local small and medium-sized enterprises to continue to develop. The research results of this paper show that: (1) The accuracy of the model in this paper is on the rise as a whole, with the highest accuracy rate of 96.2%; the highest accuracy rate of the improved neural network model is 87.1%; the highest accuracy rate of the random forest algorithm is 86.3%; and the traditional model is the highest. The accuracy rate is 80.3%. (2) The recall rate of the traditional model is between 0.0816 and 0.0984; the recall rate of the random forest algorithm is between 0.726 and 0.983; the recall rate of the improved neural network is between 0.752 and 0.961; the recall rate of the model in this paper is between 0.615 and 0.815. (3) The overall static payback period is decreasing year by year, and the overall rate of return is also increasing year by year, which shows that the cooperation between art and design education and enterprises can bring higher benefits to enterprises. (4) After the cooperation between the two companies in 2016, various indicators have risen significantly. The highest net present value is 92.55 million yuan; the highest profit index is 1.98; the highest net present value rate is 35.8%, and the highest internal rate of return is 79.2%. (5) After school 2 cooperates with the enterprises, the employment rate has increased year by year, with the highest employment rate of 88.3%. In contrast, the annual employment rate of school 1, which does not cooperate with enterprises, is irregular. (6) The percentages of environmental indicators such as total emission reduction, environmental quality, and pollution control have all increased, and resource consumption has decreased by 28%; the public's satisfaction with the results of environmental protection has also reached 90%. (7) The average evaluation of each index is above 8 points, the highest score for completeness is 8.5, the highest score for feasibility is 8.9, the highest score for recognition is 9.2, and the highest score for practicality is 8.7.

1. Introduction

As the economy continues to develop and improve, both art and design education and local SMEs are struggling. Art and design education promotes the development of local small and medium-sized enterprises, and local small and medium-sized enterprises also provide a guarantee for art and design education, and the two promote and cooperate with each other. Human beings are both creators and shapers of the environment, but in many areas, people can see signs of pollution in large areas, and the polluted environment is incompatible with the artistic beauty. In order to protect the environment and promote environmental awareness, it is also an obligation as an art designer. This paper adopts the methods of correlation degree and correlation coefficient to construct a feasibility analysis model of mutual benefit

cooperation between environment-embedded art and design education and local SMEs development based on improved grey analysis. In order to better analyze these two possibilities, achieve the ideal goal of mutual benefit. This paper has received a lot of support based on the research results so far. Grey analysis is a method of multivariate statistical analysis [1]. The concept of grey is associated with the white system and the black system [2]. Grey relational analysis can be used not only for relational analysis, but also for evaluation [3]. The grey analysis reflects the degree of correlation between the curves [4]. Grey analysis method is a method to measure the correlation between factors according to the similarity or dissimilarity of development tendency between factors [5]. Generally speaking, grey analysis can be used to analyze the degree of influence of various factors on the results [6]. Grey system theory is a system science theory developed by Professor Deng Julong [7]. The application of grey analysis includes various fields of social sciences and natural sciences [8]. Correlation is divided into absolute correlation and relative correlation [9]. Art and design education can improve people's awareness and understanding of beauty [10]. Its basic purpose is to develop balanced people [11]. Feasibility analysis is a comprehensive system analysis method that provides the basis for project decision-making [12]. Feasibility analysis is predictable, fair, reliable, and scientific [13]. Feasibility analysis is an important activity at the beginning of a project [14]. It is very important for the entire national economy [15].

2. Basic Knowledge

2.1. Grey Analysis

2.1.1. Concept.

Grey Analysis [16]. It is based on grey system theory to deal with complex systems in research, and uses a series of methods such as grey generation, grey correlation analysis, grey cluster analysis, and grey prediction to maximize the use of collected information. Choose a reasonable generation method. The actual samples of each clustered object are qualitatively and quantitatively analyzed by the whitening function of abstract dimension and spatial series curve fitting and GM modeling prediction.

The basic idea of grey analysis is relative ranking analysis. This is based on the similarity of the geometric shapes of the sequential curves to judge whether they are closely related. It is also a method for quantitatively describing and comparing the state of system development.

2.2. Grey Analysis Method.

The purpose of grey analysis is to quantitatively characterize the degree of correlation between various factors, to find the main relationship of various factors in the system, to find out the important factors that affect the development of the system, and to grasp the main characteristics.

2.2.1. Data Transformation.

The physical meaning of each element in the system is different, or the measurement unit is different, so the dimension of the data is different. And sometimes the magnitudes of the values are very different. If the dimension and the number of digits are different, it is inconvenient, or it is difficult to obtain the correct result during the comparison process. To facilitate analysis, the raw data must be processed before comparing the elements [17].

(1) Initial value processing. All data of a sequence is removed by its first number, and the method of obtaining a new sequence is called initializing. The sequence shows the multiples of different time values of the original sequence compared to the first value. The sequence has a common starting point, is dimensionless, and the data in the data are all greater than 0. With original sequence

$$x^{(0)}(i) = \left\{ x^{(0)}(1), x^{(0)}(2), \ldots, x^{(0)}(n) \right\}. \tag{1}$$

After initializing $x^{(0)}(i)$ to get $x^{(1)}(i)$, then

$$x^{(1)}(i) = \left\{ x^{(0)}(1)/x^{(0)}(1), x^{(0)}(2)/x^{(0)}(1), \ldots, x^{(0)}(n)/x^{(0)}(1) \right\},$$
$$x^{(1)}(i) = \left\{ x^{(1)}(1), x^{(1)}(2), \ldots, x^{(1)}(n) \right\}. \tag{2}$$

(2) Average processing. The method of removing all data of a series by its average value to obtain a new series is called mean processing. This new array indicates the multiples of the values at different times in the original array relative to the mean. The method of dividing all the data in a series by the mean and obtaining a new series is called averaging. This new series shows the multiples of the values of the original array at different time points relative to the mean.

With original sequence

$$x^{(0)}(i) = \left\{ x^{(0)}(1), x^{(0)}(2), \ldots, x^{(0)}(n) \right\}. \tag{3}$$

Do the mean processing on $x^{(0)}(i)$, and get $x^{(1)}(i)$ as

$$x^{(1)}(i) = \left\{ x^{(0)}(1)/x^{(0)}, x^{(0)}(2)/x^{(0)}, \ldots, x^{(0)}(n)/x^{(0)} \right\},$$
$$x^{(1)}(i) = \left\{ x^{(1)}(1), x^{(1)}(2), \ldots, x^{(1)}(n) \right\}. \tag{4}$$

In

$$x^{(0)} = \frac{1}{n} \sum_{k=1}^{n} x^{(0)}(k). \tag{5}$$

2.2.2. Correlation Coefficient.

The degree of correlation between systems or factors judges whether they are closely related according to the degree of similarity in geometry between the curves. Therefore, a measure of the degree of association between curves can be used as a measure of the degree of association [18].

Let the parent factor sequence $\{x_0(i)\}$ and the child factor sequence $\{x_j(i)\}$ be, respectively,

$$x_0(i) = \{x_0(1), x_0(2), \ldots, x_0(n)\},$$
$$x_j(i) = \{x_j(1), x_j(2), \ldots, x_j(n)\}, \tag{6}$$

Of which $i = 1, 2, \ldots, n$; $j = 1, 2, \ldots, m$. The correlation coefficient $\xi_{0j}(i)$ between $\{x_0(i)\}$ and $\{x_j(i)\}$ can be expressed by the following relation:

$$\xi_{0j}(i) = \frac{\min_j \min_i |x_0(i) - x_j(i)| + \rho \max_j \max_i |x_0(i) - x_j(i)|}{|x_0(i) - x_j(i)| + \rho \max_j \max_i |x_0(i) - x_j(i)|}. \tag{7}$$

Among them, $\xi_{0j}(i)$ is called the correlation coefficient of x_0 to x_j at time i.

Write down the minimum absolute value difference between the two levels at each moment as

$$\nabla_{\min} = \min_j \min_i |x_0(i) - x_j(i)|. \tag{8}$$

The maximum absolute value difference between the two levels is recorded as

$$\nabla_{\max} = \max_j \max_i |x_0(i) - x_j(i)|. \tag{9}$$

2.2.3. Relevance. A measure of the magnitude of the correlation between two systems or two factors is called the degree of correlation [19]. The degree of correlation represents the relative change between factors in the system development process, that is, the relativity of the magnitude, direction, and speed of the change. A correlation between two is considered large if two relative changes during development are substantially the same. Otherwise, the correlation between the two becomes smaller.

The degree of association is denoted as r_{0j}, and its expression is

$$r_{0j} = \frac{1}{N} \sum_{i=1}^{N} \xi_{0j}(i). \tag{10}$$

Among them, r_{0j} represents the degree of correlation between the sub-number sequence j and the parent sequence 0 [20]. N represents the length of the sequence, that is, the number of data [21].

(1) Dun's correlation degree

$$r(x_0, x_i) = \frac{1}{n} \sum_{i=1}^{n} r(x_0(k), x_i(k)), \tag{11}$$

In

$$r(x_0(k), x_i(k)) = \frac{\min_i \min_k |x_0(k) - x_i(k)| + \rho \max_i \min_k |x_0(k) - x_i(k)|}{|x_0(k) - x_i(k)| + \rho \max_i \min_k |x_0(k) - x_i(k)|}, \tag{12}$$

ρ is the resolution factor, and $\rho \in [0, 1]$.

(2) Grey absolute correlation degree

$$\varepsilon_{0i} = \frac{1 + |s_0| + |s_i|}{1 + |s_0| + |s_i| + |s_i - s_0|}, \tag{13}$$

the absolute correlation degree is the grey absolute correlation degree obtained by considering the polygonal change of the curve relative to the starting point, that is, by moving the starting point of the data series curve to the coordinate point and checking its proximity.

(3) Relative degree of correlation

Let X_0 and X_i have the same length, and the initial value may not be equal to zero [22]. X_0' and X_i' are the initial value images of X_0 and X_i, respectively, then the absolute grey correlation degree of X_0' and X_i' is called the grey-relative correlation degree of X_0 and X_i, which is referred to as the relative correlation degree and denoted as r_{0i}.

$$r_{0i} = \frac{1 + |s_0'| + |s_i'|}{1 + |s_0'| + |s_i'| + |s_i' - s_0'|}, \tag{14}$$

the relative degree of correlation is the absolute degree of grey-scale correlation of the initialized sequence calculated after initializing the original sequence. The grey-scale absolute correlation is the proximity of the absolute values of the sequence polygons, and the grey-relative correlation is the proximity of the absolute values of the sequence polygons. This formula is used to investigate the closeness of the rate of change of a series of polygons relative to the starting point. The grey relative and grey absolute relevance are calculated in the same way, so the range of applicable sequences is also the same, but the starting points of the two objects are different.

(4) Slope correlation

$$\varepsilon_i = \frac{1}{n-1} \sum_{t=1}^{n-1} \xi_i(t). \tag{15}$$

The slope correlation mainly considers the vicinity of the slope between the data series curves, so the internal slope of the data series needs to be calculated, but since the internal slope of the indicator series cannot be calculated, it is only suitable for time series.
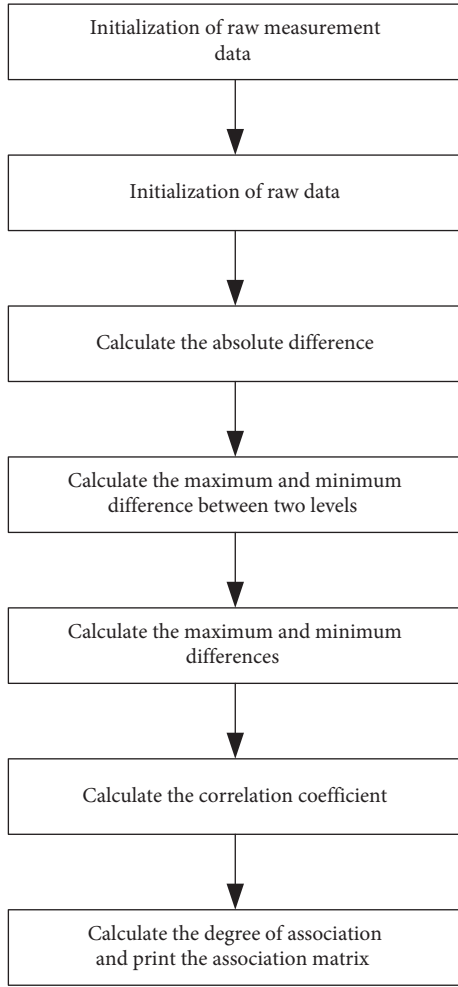
FIGURE 1: Grey analysis model.

2.3. Grey Analysis Model

(1) The dimensionlessization of the evaluation factor is aimed at eliminating incommensurability.

There is m evaluation factor $x_1, x_2, ..., x_m$ and n objects participating in the evaluation, then the original data matrix x_{ij} can be obtained. Depend on

$$P_{ij} = \frac{x_{ij}}{\sum_{j=1}^{n} x_{ij}}, \quad (j = 1, 2, ..., n). \quad (16)$$

The dimensionless evaluation factors can be obtained.

(2) Find the absolute difference

$$z_{ij} = \left| p_{ij} - p_{ij\,\text{max}} \right|, \quad (i = 1, 2, ..., m), \quad (17)$$

and find its maximum value $z'_{j\,\text{max}}$ and minimum value $z'_{j\,\text{min}}$, where $(j = 1, 2, ..., n)$.

(3) Find the maximum value z''_{max} and the minimum value z''_{min} of $z'_{j\,\text{max}}$ and $z'_{j\,\text{min}}$ $(j = 1, 2, ..., n)$.

(4) Find the correlation coefficient.

Use the formula:

$$\xi_{ij} = \frac{z''_{\text{min}} + 0.5 z''_{\text{max}}}{z_{ij} + 0.5 z''_{\text{max}}}, \quad (i = 1, 2, ..., m, j = 1, 2, ..., n, \rho = 0.5), \quad (18)$$

(5) Find the correlation degree r_i of each factor.

$$r_i = \frac{1}{n} \sum_{j=1}^{n} \xi_{ij}, \quad (i = 1, 2, ..., m), \quad (19)$$

when r_i is larger, the importance of index x_i in each evaluation factor is stronger, which reflects the closeness and influence of the comparison sequence and the reference sequence.

(6) Calculate the weights of each item w_i

Use the formula:

$$w_i = \frac{r_i}{\sum_{i=1}^{m} r_i}. \quad (20)$$

From this, the weight of each evaluation factor can be obtained. It is shown in Figure 1.

The grey analysis model first needs to initialize the original measurement data, how to initialize the original data, then calculate the absolute difference, the two-level maximum difference and the minimum difference, calculate the maximum difference and the minimum difference, calculate the correlation coefficient, and finally calculate the correlation degree and print the association matrix.

3. Feasibility Analysis of Environment-Embedded Art and Design Education and Mutually Beneficial Cooperation in the Development of Local Small and Medium-Sized Enterprises

3.1. Environment Embedding.

Environment refers to environmental protection, ecological environment pollution, etc. Embedded means firmly fixed or established. Environmental embeddedness is guided by national goals or strategic needs, in-depth art and design education process, and raising people's value expectations for education. Environment-embedded art design education is to protect the environment, protect ecological balance, and promote environmental awareness through art design. The goals and strategic needs of the country set what kind of people to cultivate for art and design education. SMEs provide talent support and market position for art and design education. Environmental embedding usually includes three levels: macro, meso, and micro.

3.1.1. Macro-Level.

From the macro-level environmental embedding, we will promote the high-quality reform of art and design education. Local SMEs promote economic development and guide the strategic direction of serving local economic development. Provide strong economic and technical support for art and design education. However, the current talent training in art and design education cannot

meet the skills and quality requirements for the economic development of local SMEs. Art and design education needs to strengthen the implementation of quality reform to adapt to this new situation. In order to deepen the concept of cooperation with local SMEs, we will take the lead in taking measures. In the education quality reform, continuously improve the quality of personnel training and complete the reform of art and design education [23].

3.1.2. Meso-Level. The environmental embedding at the mesoscopic level enhances the value expectation of artistic talents [24]. Now, the development of SMEs is very effective, the possibility of growth is high, full of vitality, with broad prospects, talent cultivation in art and design education, and the expectation and value of work are getting stronger and stronger.

3.1.3. Micro-Level. From the micro-level environmental embedding, improve the adaptability of students to the employment of art and design [25]. Local small and medium-sized enterprises require educators to focus on cultivating students' artistic literacy. More than any other company in the past, they attach great importance to the talent of art and design education, and further improve the staff's requirements for comprehensive quality, knowledge, and cultural level. Through the construction of art and design education, the awareness of cooperation among art students will be continuously improved, the employability of art students will be improved, and more guarantees and opportunities will be provided for art students.

3.2. The Role of Environmental Protection in Art and Design Education. Art design education and environmental protection are closely linked. Art design alone and ignoring environmental protection will only damage the environment. Therefore, it is the responsibility of art design education to establish environmental protection awareness. Art design education is reflected in environmental protection, combining art design with environmental protection, beautifying people's living environment through art design, and achieving the purpose of environmental protection.

3.2.1. In Interior Design. Art design should combine landscaping interior design with green environmental protection. Interior design should not only pursue beauty and comfort, but also pursue green energy conservation.

3.2.2. In Daily Life. People often encounter discarded items that most people choose to throw away, and this is the act that causes our environment to be destroyed. Through art and design education, we can choose to make reasonable use of these discarded items and turn waste into treasure. This can not only reduce economic investment, but also reduce waste of resources, thereby protecting the environment.

3.2.3. In the Design of Landscape Facilities. You can choose to install the energy-saving device on the locust disaster landscape facilities, which can not only bring the required energy to the landscape facilities, but also reduce the dependence on environmental resources, thus playing a role in the environmental protection.

3.3. The Current Situation of Art and Design Education and the Development of Local Small and Medium-Sized Enterprises

3.3.1. The Development of Art and Design Education has Made Great Progress So Far. However, with the rapid development of the economy and the demand for high-level talents in modern industries, the confusion of "talented products" of art and design education and the demand for Chinese industries are becoming more and more serious. For example, in the traditional training method, the growth design talent lacks practicality and creativity, and does not meet the diverse market needs. The subject system is composed of a single repetition, without characteristics, and it is difficult to meet the needs of the multilevel market. The department of experts is too small, the boundaries of experts are too clear, and the integration of each other is insufficient. The teaching method is closed, the teaching method is not innovative, and the students cannot thoroughly practice learning.

3.3.2. Development Status of Small and Medium-Sized Enterprises. Compared with large enterprises, SMEs are more innovative and dynamic. However, it is disadvantageous in terms of scale and strength, and SMEs in the development stage do not want to spend a lot of money on the design and planning of corporate image and product appearance. Products that symbolize low prices and low quality, lack of independent brands, lack of product design and development after technical level, lack of long-term corporate image and product development and design plans, etc., all limit the long-term development of enterprises.

3.3.3. Analysis of the Relationship between Art and Design Education and Local SMEs. In developed countries, art and design education takes the form of a studio. Enterprises and universities cooperate to implement product research and development, design, packaging, publicity, etc., and use each other to bring benefits to each other. In recent years, many universities in our country have also adopted this method, but it has no substantial effect. Art and design education and small and medium-sized enterprises are independent, there is no complementary advantage, there is no resource sharing and mutually beneficial cooperation system. The favorable resources for artistic talents are wasted in large quantities, and small and medium-sized enterprises have been ignoring the careful development of products because of problems such as capital and thinking concepts, and the two have not entered the virtuous circle of the market economy.

3.4. The Practical Value of Mutually Beneficial Cooperation between Art and Design Education and the Development of Local SMEs. Facing today's market economy, art and design education and small and medium-sized enterprises will face development opportunities and fierce competition pressure. Art and design education should be helpful to local SMEs. There is a need to promote the development of art and design education. In order to have a broader development space, the two complement each other and cooperate with each other.

3.4.1. Improve the Competitiveness of Enterprises and the Added Value of Products. The development of small and medium-sized enterprises is the bright spot of local economic development and the most powerful main force of local economy. Art and design education is historically important for improving the possibility of developing small and medium-sized enterprises, producing high-value-added high-end products, forming a benign corporate operation track, and creating an independent corporate brand.

3.4.2. Improve Social Awareness and Brand Competitiveness. Today, education is completely introduced into the market, and design education is faced with both hot and difficult issues such as financing, registration, and employment. The training of design talents, in order to meet the needs of the market and promote the development and growth of the enterprise, needs the financial support of the enterprise. The growth of the enterprise provides an important guarantee for education, and puts forward higher educational requirements and goals.

3.4.3. Improve Product Quality Standards for Design Talents and Solve Local Employment Problems. To cultivate highly innovative and practical art design talents for the society is the basic goal of art design education. SMEs have played an important role in the reform of art and design education, the establishment of the foundation of educational practice, and the transformation of educational outcomes.

3.4.4. Accelerate the Transformation of Scientific Research Achievements in Art Design. Education is the main source of knowledge innovation, the driving force of the economy, and the driving force of enterprise reform. SMEs have excellent resources for capital and industrial implementation. Two double-edged swords, combining resources to complement each other, in-depth cooperation, improving their respective market adaptability and innovation vitality, effectively combining cultural, scientific research and economic interests, transforming cultural productivity into social productivity, and promoting the healthy development of local economy.

4. Experimental Analysis

4.1. Model Testing. This article conducts feasibility analysis based on the grey analysis model. This part needs to test the grey analysis model and compare the grey analysis model with the improved neural network and random forest algorithm and traditional models. The experiment selects the enterprise income after the cooperation between a university's art design and small and medium-sized enterprises as the experimental data.

Comparing the accuracy of different models on the results of cooperation between art and design education and SMEs, the results are shown in Figure 2.

As can be seen from Figure 2, the overall accuracy of the model in this paper is on the rise, but it has declined in 2018. The highest accuracy rate is 96.2% and the lowest accuracy rate is 86.7%; the overall upward trend of the improved neural network model is not obvious, and it is rising. There were two downward trends in the process, the highest accuracy rate was 87.1%, and the lowest accuracy rate was 80.7%; the overall random forest algorithm also showed an upward trend, and it rose slowly after 2017, with the highest accuracy rate of 86.3% and the lowest accuracy rate. The accuracy rate of the traditional model is the lowest, although the increase is more obvious, the highest accuracy rate is 80.3%, but the lowest accuracy rate is 70.3%. It can be seen that the grey analysis model proposed in this paper has a high accuracy.

On this basis, in order to further verify the effectiveness of the grey analysis model, the recall rate of the results of cooperation between art design education and small and medium-sized enterprises was used as an experimental indicator to test the performance of different models. The recall rate is inversely proportional to the accuracy rate. When the recall rate is low, the accuracy rate is high, which proves that the effectiveness of the model is higher. The recall rates of different models are shown in Figure 3.

As can be seen from Figure 3, the recall rate of the traditional model is between 0.0816 and 0.0984; the recall rate of the random forest algorithm is between 0.726 and 0.983; the recall rate of the improved neural network is between 0.752 and 0.961; the recall rate of this model is 0.615–0.815. It can be clearly seen from the experimental results that the recall rate of the model in this paper is smaller than that of the other three models. According to the high accuracy rate when the recall rate is low, it can be concluded that the model in this paper is more effective.

4.2. Feasibility Analysis. In order to better reflect the feasibility of mutual beneficial cooperation between art and design education and local small and medium-sized enterprises, this article compares the static and dynamic indicators of local small and medium-sized enterprises before and after cooperation with art and design education and the advantages of mutually beneficial cooperation. The feasibility analysis indicators of mutual benefit cooperation between art design education and local SMEs can be divided into static indicators and dynamic indicators. Static indicators are static payback period and rate of return; dynamic indicators are net present value, net present value rate, profit index, and internal rate of return.

4.2.1. Static Indicators. In order to analyze whether the mutual cooperation between art and design education and local SMEs can bring better benefits to enterprises, this
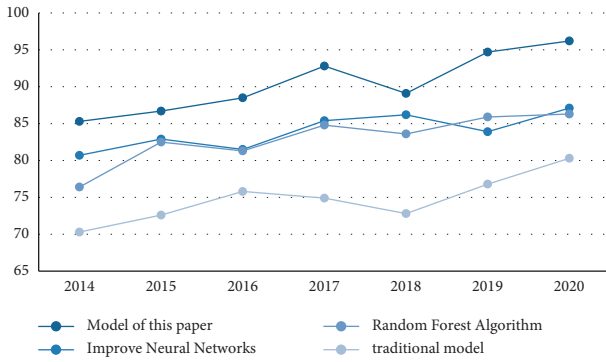
FIGURE 2: Accuracy comparison.
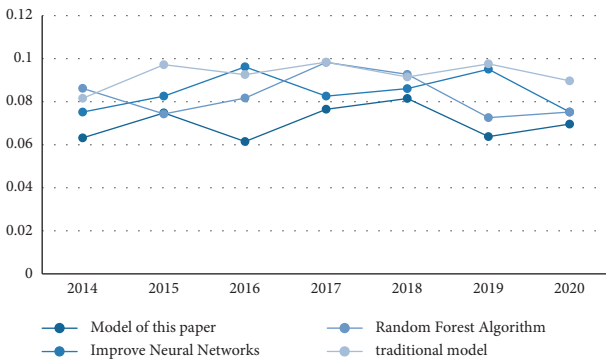
FIGURE 3: Comparison of recall rates.

article compares the static indicators before and after cooperation. The experiment will make art and design education and local SMEs in 2016. Carry out mutually beneficial cooperation and calculate the value of various static indicators from 2014 to 2015. The results are shown in Table 1:

It can be seen from Figure 4 that the overall static payback period is decreasing year by year, but the static payback period is increasing before the mutual benefit cooperation between art and design education and local SMEs. The highest static payback period is 3.5 years, and it is reduced to 1.3 years. The overall rate of return is also increasing year by year, but the rate of return is decreasing before the mutual cooperation between art and design education and local small and medium-sized enterprises. The lowest rate of return is 61.4% and the highest rate of return is 87.8%. It shows that the cooperation between art and design education and enterprises can bring higher benefits to enterprises.

4.2.2. Dynamic Indicators. In order to analyze whether the mutual benefit cooperation between art and design education and local small and medium-sized enterprises can bring better benefits to enterprises, this article will also compare the dynamic indicators before and after cooperation. Enterprises conduct mutually beneficial cooperation and calculate the value of various dynamic indicators from 2014 to 2015. The results are shown in Table 2:

As can be seen from Figure 5, various dynamic indicators generally show an upward trend, and the indicators are still decreasing before the cooperation between art and design education and enterprises. After the cooperation between the two parties in 2016, various indicators have risen significantly. The highest net present value is 92.55 million yuan; the highest profit index is 1.98, and the project is feasible only when the profit index is greater than 1 or equal to 1, indicating that the feasibility is fully reflected when the two cooperate; the highest net present value is 35.8%, the highest internal rate of return is 79.2%. Various dynamic indicators show that the mutual beneficial cooperation between art and design education and local small and medium-sized enterprises is feasible, and it can also bring greater benefits to small and medium-sized enterprises, and the income is increasing year by year.

4.3. Analysis of the Employment Situation of Art and Design Students. This article analyzes the considerable benefits that reciprocal cooperation brings to companies, as well as the benefits for art and design education students. The experiment also adopts the comparison method, selecting two colleges and universities with art and design education majors, school 1 does not cooperate with enterprises, and school 2 cooperates with enterprises, and compares the employment rate of students after graduation from 2014 to 2020 in the two colleges and universities. The result is shown in Figure 6:

It can be seen from Figure 6 that after School 2 cooperates with enterprises, the employment rate has increased year by year. Although there was a slight decline in 2016, it has not declined since 2016, with the highest employment rate of 88.3%. On the other hand, the annual employment rate of schools 1 that do not cooperate with enterprises is irregular, sometimes rising and falling, which is relatively unstable. The highest employment rate was 76.3%, which was 12% lower than the highest employment rate in School 2. It shows that schools that cooperate with enterprises have higher employment rates and provide more job opportunities for students.

4.4. Comparison of Environmental Protection. This article also compares the environmental protection indicators before and after the cooperation between art and design education and local small and medium-sized enterprises. The comparison indicators are total emission reduction, resource consumption, environmental quality, pollution control, and public satisfaction with environmental protection. The results are shown in Figure 7.

As can be seen from Figure 7, the percentages of environmental indicators such as total emission reduction, environmental quality, and pollution control are all increasing, and the increase rate is large; resource consumption is decreasing by 28%. Satisfaction also reached 90%. It shows that the cooperation between the two has played an obvious role in environmental protection and should be vigorously promoted.

TABLE 1: 2014–2020 static indicators.

Index	2014	2015	2016	2017	2018	2019	2020
Static payback period	3.4	3.5	2.8	2.5	2.2	1.6	1.3
Rate of return	63.8%	61.4%	70.3%	72.6%	75.8%	83.4%	87.8%
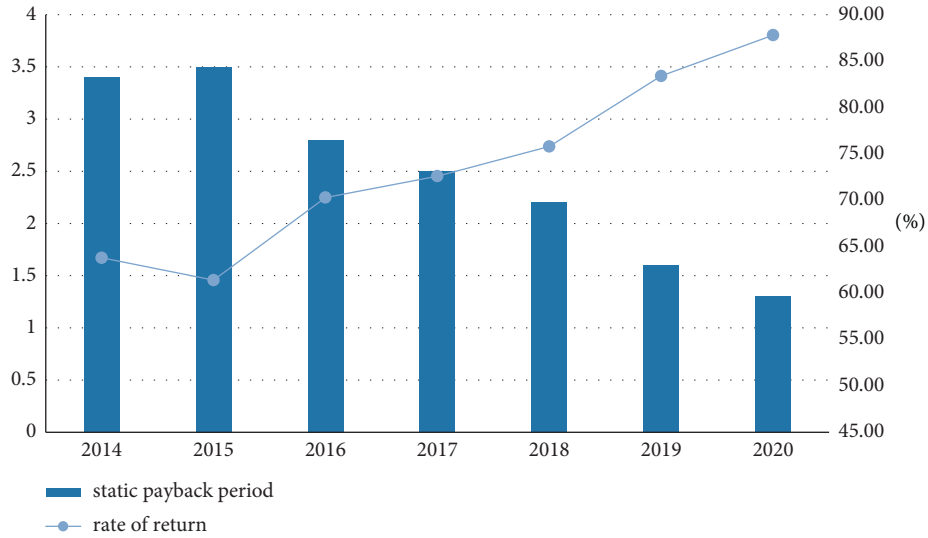
FIGURE 4: 2014–2020 static indicators.

TABLE 2: Dynamic indicators from 2014 to 2020.

Index	2014	2015	2016	2017	2018	2019	2020
Net present value (ten thousand yuan)	6757	5938	7982	8326	8746	8927	9255
Net present value rate	16.7%	14.4%	21.4%	26.3%	29.1%	32.4%	35.8%
Profitability index	0.87	0.63	1.72	1.76	1.63	1.98	1.98
Internal rate of return	58.2%	54.8%	61.7%	62.8%	74.3%	77.8%	79.2%
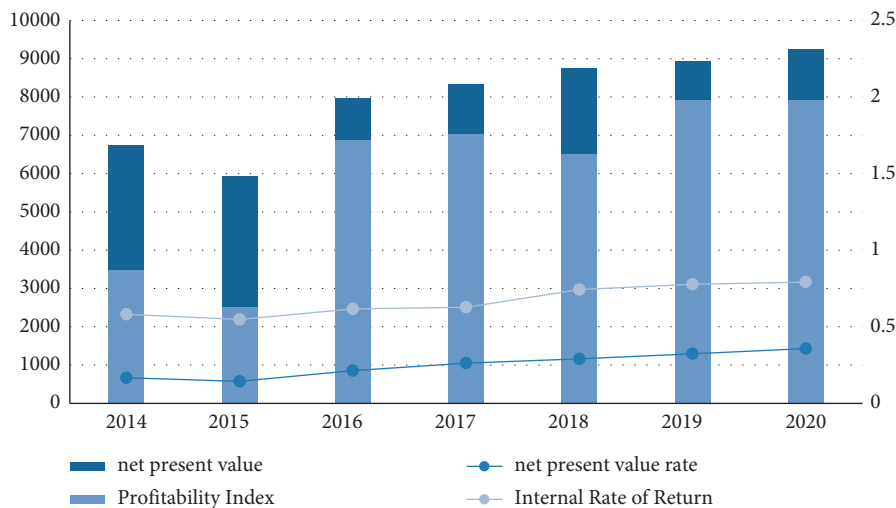
FIGURE 5: Dynamic indicators from 2014 to 2020.

4.5. Feasibility Evaluation. The environment embedded art design education based on improved grey analysis and the mutually beneficial cooperation with local small and medium-sized enterprises still need to be evaluated by people from all walks of life. In the experiment, experts in different fields, as well as students and business entities were invited to evaluate the various indicators of the cooperation. If the average value of each indicator is above 8 points, it means
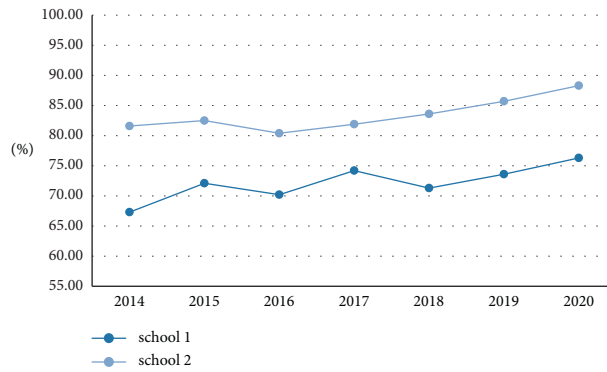
Figure 6: Analysis of student employment situation.
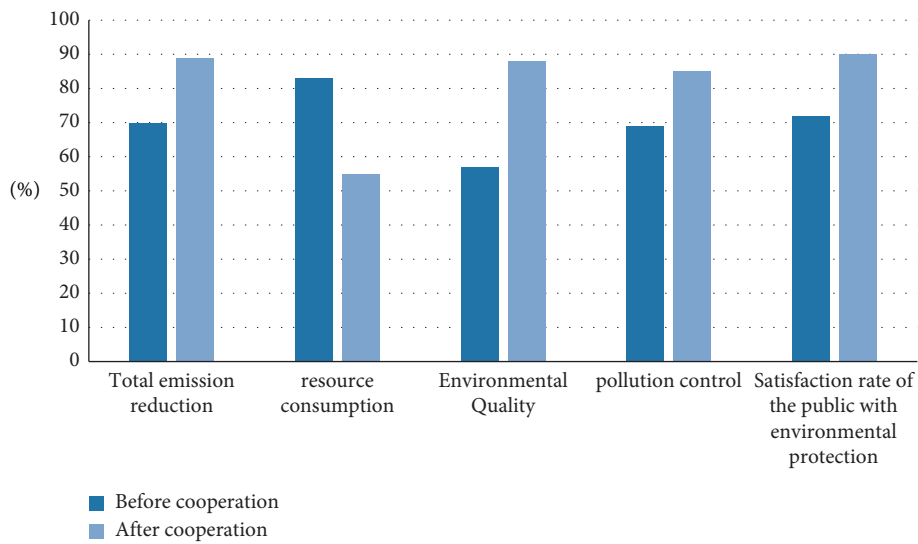
Figure 7: Comparison of environmental protection.
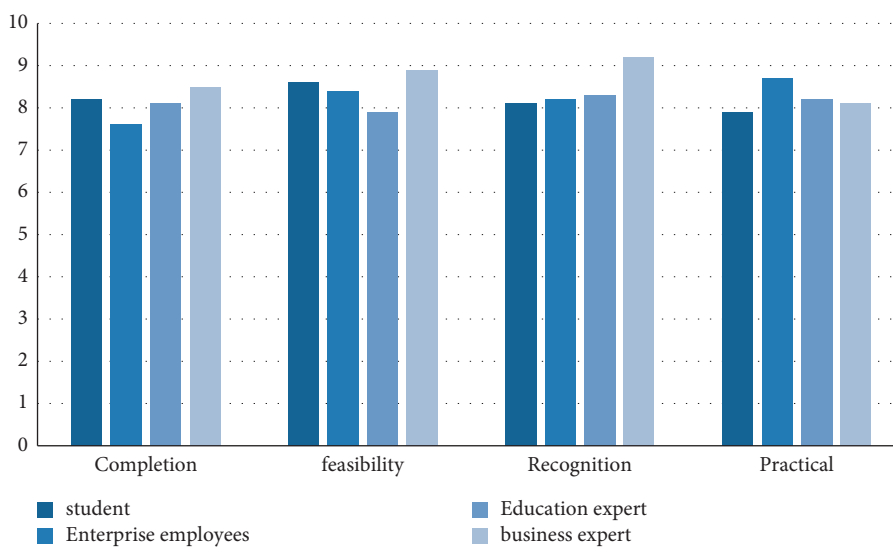
Figure 8: Feasibility evaluation.

that the cooperation is feasible. The result is shown in Figure 8:

As can be seen from Figure 8, experts, students, and business entities have high evaluations of the reciprocal cooperation proposed in this paper. The average evaluation of each index is above 8 points. The highest score for completeness is 8.5, and the highest score for feasibility is 8.9, the highest score for recognition is 9.2, and the highest score for practicality is 8.7. It shows that art and design education is feasible for local SMEs to develop mutually beneficial cooperation.

5. Conclusion

With the increasing number of college graduates year by year, it is also a big problem for college students to find jobs, and in the face of market competition, small and medium-sized enterprises do not have an advantage. Based on this phenomenon, this article proposes that art and design education and local small and medium-sized enterprises develop mutually beneficial cooperation, so that art and design education can serve small and medium-sized enterprises, and small and medium-sized enterprises can promote the development of art and design education, and play the ultimate goal of environmental protection. This article adopts the method of correlation degree and correlation coefficient to construct a feasibility analysis model based on improved grey analysis of environment-embedded art and design education and the development of mutual benefit cooperation between local SMEs. In order to make art and design education and local SMEs develop together in a better direction.

The findings of the article show that:

(1) The accuracy rate of the model in this paper is on the rise as a whole, with the highest accuracy rate of 96.2% and the lowest accuracy rate of 86.7%; the overall upward trend of the improved neural network model is not obvious, and the highest accuracy rate is 87.1%. In the upward trend, the highest accuracy rate is 86.3%; while the traditional model has the lowest accuracy rate, the highest accuracy rate is 80.3%. It can be seen that the grey analysis model proposed in this paper has a high accuracy.

(2) The recall rate of the traditional model is between 0.0816 and 0.0984; the recall rate of the random forest algorithm is between 0.726 and 0.983; the recall rate of the improved neural network is between 0.752 and 0.961; the recall rate of the model in this paper is between 0.615 and 0.815. From the experimental results, it is obvious that the model in this paper is more effective.

(3) The overall static payback period shows a decreasing trend year by year, the highest static payback period is 3.5 years, and the decrease is 1.3 years. The overall rate of return is also increasing year by year, the lowest rate of return is 61.4%, and the highest rate of return is 87.8%. It shows that the cooperation between art and design education and enterprises can bring higher benefits to enterprises.

(4) The overall dynamic indicators showed an upward trend. After the cooperation between the two parties in 2016, the indicators increased significantly. The highest net present value is 92.55 million yuan; the highest profit index is 1.98; the highest net present value rate is 35.8%, and the highest internal rate of return is 79.2%. Various dynamic indicators show that the mutual beneficial cooperation between art and design education and local small and medium-sized enterprises is feasible, and it can also bring greater benefits to small and medium-sized enterprises, and the income is increasing year by year.

(5) After school 2 cooperates with enterprises, the employment rate has increased year by year, with the highest employment rate of 88.3%. On the other hand, the annual employment rate of schools 1 that do not cooperate with enterprises is irregular, sometimes rising and falling, which is relatively unstable. It shows that the schools that cooperate with enterprises have higher employment rates and provide more job opportunities for students.

(6) The percentages of environmental indicators such as total emission reduction, environmental quality, and pollution control are all on the rise, and the rate of increase is large; resource consumption is decreasing by 28%; the public's satisfaction with the results of environmental protection has also reached 90%. It shows that the cooperation between the two has played an obvious role in environmental protection and should be vigorously promoted.

(7) The average evaluation of each indicator by experts, students, and business entities is above 8, the highest score for completeness is 8.5, the highest score for feasibility is 8.9, the highest score for recognition is 9.2, and the highest score for practicality is 8.5. The highest score was 8.7. It shows that art and design education is feasible for local SMEs to develop mutually beneficial cooperation.

In order to promote mutually beneficial cooperation between art and design education and local small and medium-sized enterprises, it is necessary to establish a discipline system of art and design education with local economic characteristics; formulate a talent training model for art and design education with local economic characteristics; strengthen school-enterprise cooperation;, realize the personalized training of talents; actively promote the achievements of art and design scientific research to local small and medium-sized enterprises, and realize the transformation of knowledge into economic wealth. Although the experimental results in this paper have obvious advantages, they still have certain limitations. This model is limited to art and design education, and it is not obvious in other majors. It is hoped that further research can be carried out on the scope of application in the following research to increase the universality of the model.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest regarding this work.

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Research Article

Using a Random Forest Model to Study the Impact of Local Government-Led Urbanization on Urban Sustainable Development

Yixiao Peng [iD]

School of Economics, Zhejiang University of Technology, Hangzhou 310023, Zhejiang, China

Correspondence should be addressed to Yixiao Peng; 10743@163.com

Urbanization has accelerated China's economic growth, but it has also brought many sustainability issues. This paper selected a random forest model to study the impact of local government-led urbanization on urban sustainable development. Urbanization affected urban sustainable development through government revenue expansion, land resources mismatch, and industrial structure adjustment. The results showed that the adjustment of industrial structure has the greatest impact on urban sustainable development, and the importance of the average output of industrial enterprises confirms it. Government revenue expansion and land resources mismatch are more important to the sustainable development of representative urban agglomerations. The goodness of fit of the random forest model is better than the multiple linear regression (MLR) model and the extreme gradient boosting (XGBoost) model. The generalization ability of the model is improved with the optimization of variables. The main contribution of this paper is that we have established a complete information dynamic game model on government revenue expansion, land resource mismatch, industrial structure adjustment, and urban sustainable development. And the random forest model is used to study the relationship between the above variables.

1. Introduction

In the current stage of China's urbanization process, land resource mismatch, imbalance of industrial structure, and government revenue expansion have brought negative impacts on the urban sustainable development. China's central government has regarded GDP development as the primary goal in the past, and it regards achievements in GDP development as the promotion standard of local government officials [1]. Promotion incentives enable local governments to accelerate economic development through land management [2].

There are three mechanisms for local governments to develop the economy through land management. Firstly, local governments attract enterprises and residents to invest in urban construction through the land resources mismatch. As the local governments control the supply of the primary land market, the price of commercial residential land is much higher than that of industrial land [3–5]. The low price

of industrial land has attracted enterprise investment, while the increasing price of commercial and residential land has attracted residents to invest in real estate; these investments boost economic growth [6, 7]. However, local governments attract investment through low-price competition, and the cheap industrial land lowers the entry threshold for companies, resulting in excess capacity and environmental pollution [8–10].

Secondly, local governments have gained more revenue through the price difference between industrial land and commercial residential land to promote economic growth, which is called land finance [11–13]. In the long-term process of developing the economy by operating land, the local government has become dependent on land finance and increased its income by continuously hoarding land and raising the price of land [7, 14]. This approach has created a speculative bubble in the real estate market, which is not sustainable. At the same time, land finance has also caused

many unsustainable problems such as environmental pollution and increased carbon emissions [15–17].

Thirdly, land development led by local governments accelerates urbanization and increases the rate of economic growth [18–20]. Land development expands urban areas and promotes economic growth through capital accumulation [21–23]. Urbanization concentrates population density and increases the ecological footprint, pushing the environment beyond carrying capacity [24–26]. In the process of industrialization, urbanization, and economic development, urban carbon emissions have increased significantly [27–31]. Some local governments blindly promote urbanization to develop the economy, resulting in many ghost towns [32]. The excessive urban expansion will also occupy many arable land resources, thus threatening the ecological environment and sustainable development [23, 33–35].

In general, urbanization, economic development, and land management led by the government will bring environmental problems, which have seriously hindered urban sustainable development. However, sustainable development involves more than just the environmental dimension; the Sustainable Development Goals system (SDGs) projected by the United Nations covers seventeen areas such as good health, quality education, and economic growth. As urbanization, land resources mismatch, and economic development bring more government revenue, China's sustainable development elements such as infrastructure, living standards, and public services have greatly improved [36–40]. Therefore, the urbanization led by the government will affect the level of urban sustainable development, and the direction of urban sustainable development depends on government expenditure preferences and land development planning. If local governments intend to channel revenues more to growth-oriented infrastructure, it will crowd out expenditure on welfare programs and public services [41]. Infrastructure investment will further increase government revenue and form internal strengthening mechanisms [42, 43], which cause excessive urbanization and hinder urban sustainable development. If the local government provides more land for the construction of public services and intends to channel revenues more to industrial restructuring, the living conditions of residents will be improved, and environmental pollution and carbon emissions will be reduced [44, 45].

The contributions of this paper can be summarized as follows: (1) The complete information dynamic game model we build shows a new theory about government revenue expansion, land resources mismatch, industrial structure adjustment, and urban sustainable development. (2) The random forest model was selected to fit the nonlinear relationship between government revenue expansion, land resources mismatch, industrial structure adjustment, and urban sustainable development. (3) More detailed conclusions are drawn from the study of the eastern, central, and western representative urban agglomerations.

In the rest of this paper, the second section introduces the theoretical model; the third section introduces methodology and data; the fourth section shows the results and discussion; the fifth section gives the conclusions.

Table 1: A simple Nash equilibrium game of local government competition.

Local governments a/b	GDP development	Sustainable development
GDP development	$\rho_1 + \sigma_1, \rho_1 + \sigma_1$ [1]	$\rho_1 + \sigma_1, \rho_2 + \sigma_2$
Sustainable development	$\rho_1 + \sigma_1, \rho_2 + \sigma_2$	$\rho_2 + \sigma_2, \rho_2 + \sigma_2$

ρ_1 and σ_1 corresponding to economic growth mode. ρ_2 and σ_2 corresponding to sustainable development model.

2. Theoretical Model

The promotion incentive mechanism makes local governments compete in revenue expansion, urbanization, land management, and industrial development. This competition can be described as a simple Nash equilibrium game (Table 1). Suppose that local government A and local government B have two strategies of GDP development and sustainable development. Both strategies can make local governments obtain the payoff of regional GDP level improvement ρ and government revenue increases σ. The local government will develop strategies based on the total payoff $\rho + \sigma$. Under the economic development strategy, local governments channel revenues more to growth-oriented infrastructure, which promotes GDP growth, accelerates the process of urbanization, and brings additional revenue. As the sustainable development strategy requires the government to invest revenue in public services and industrial upgrading, this will slow down urbanization and economic growth and cause ρ, $\sigma_1 > \sigma_2$. Therefore, local governments that adopt the GDP development strategy can always obtain more payoffs. In the equilibrium state, local governments A and B will adopt the GDP development strategy, which maximizes the payoff for both sides.

However, the development of GDP with the realization of sustainable economic development is not achieved overnight, and industrial upgrading is a long process. The above Nash equilibrium cannot accurately reflect the game relationship of local governments. Therefore, this study introduces the complete information dynamic game model to demonstrate the game relationship between local governments [46].

On the premise of completely taking economic development as the goal, the utility function of local government can be expressed as

$$U_i = \beta x_i + \theta_1 y_i - z_i. \tag{1}$$

U_i is the total utility of local government. x_i represents the revenue scale of local governments (including general public budget revenue, social insurance revenue, and land revenue). Urbanization will promote economic development and increase government revenue. β is the marginal utility of government revenue, including public services, infrastructure investment to stimulate economic growth, making up the deficit, and official promotion. y_i is GDP. θ_1 is the marginal utility of GDP development. z_i is the negative impact of economic development and urbanization, such as arable land degradation, environmental pollution, and overcapacity.

Since the central government has put forward the goal of sustainable development, we assume that local governments choose industrial upgrading with a ratio α. θ_2 is the marginal utility of industrial upgrading. The size of θ_1 and θ_2 depends on the development strategy of the central government. The utility function of local government can be expressed as

$$U_i = \beta(1-\alpha)x_i + \theta_1(1-\alpha)y_i - z_i + \theta_2\alpha y_i. \tag{2}$$

Industrial upgrading needs government support, so the government revenue is reduced to $(1-\alpha)x_i$. The competition between local governments will produce negative spillover effects, and the actual utility of local governments 1 and 2 can be expressed as

$$U_1' = U_1 - \gamma_1 U_2, \tag{3}$$

$$U_2' = U_2 - \gamma_2 U_1. \tag{4}$$

The relationship between U_1' and α_1 can be expressed as

$$\frac{dU_1'}{d\alpha_1} = -\beta x_1 - (\theta_1 - \theta_2)y_1. \tag{5}$$

When $\theta_1 > \theta_2$ and $dU_1'/d\alpha_1 < 0$, reducing the industrial upgrading ratio α_1 will increase the actual utility of local government 1. The relationship between U_1' and α_2 can be expressed as

$$\frac{dU_1'}{d\alpha_2} = \gamma_1[\beta x_2 + (\theta_1 - \theta_2)y_2]. \tag{6}$$

When $\theta_1 > \theta_2 \theta_1 > \theta_2$ and $(dU_1'/d\alpha_2) > 0$, reducing industrial upgrading ratio α_2 will reduce the actual utility of local government 1. Equations (5) and (6) show that if the local government pays more attention to GDP development, reducing the industrial upgrading ratio will increase its own actual utility and reduce the actual utility of other local governments. This will lead local governments to abandon the industrial upgrading strategy and join the GDP development competition.

However, as the local government revenue rises rapidly, the central government will penalize this behavior to protect the economy, and it leads to $\beta < 0$. If the penalization is sufficiently severe, equations (5) and (6) will be less than 0. Local government 1 will increase the industrial upgrading ratio α_1 to improve its own actual utility, and it will reduce the actual utility of local government 2.

Government expenditure cannot permanently stimulate the GDP development, and urbanization also has bottlenecks, so we assume that x_i and y_i have the following function:

$$y_i = c \ln x_i. \tag{7}$$

Studies have proved that China's carbon emissions, environment, and other sustainable development factors have Kuznets Curve [47–49]. We assume that z_i and y_i have the following function:

$$z_i = ay_i - by_i^2. \tag{8}$$

a, b, and c are positive parameters. Taking equations (7) and (8) into equation (6),

$$U_i = \beta(1-\alpha)x_i + \theta_1(1-\alpha)c \ln x_i$$
$$- \left(a(1-\alpha)c \ln x_i - b(1-\alpha)^2 c^2 (\ln x_i)^2\right) + \theta_2\alpha c \ln x_i. \tag{9}$$

The first-order condition can be obtained by taking the derivative of x_i:

$$\frac{dU_i}{dx_i} = \beta(1-\alpha) + [(\theta_1 - \theta_2 - a)(1-\alpha) + \theta_2$$
$$+ 2b(1-\alpha)^2 c \ln x_i]\frac{c}{x_i}. \tag{10}$$

When $\beta > 0$, if $\theta_1 - \theta_2 > a$, $(dU_i/dU_i) > 0$. It shows that when the marginal utility of GDP development is bigger than that of industrial upgrading, the local government will improve its own utility by expanding the scale of government revenue. However, as x_i increases large enough, the second term on the right of equation (10) approaches 0, and the symbol dU_i/dU_i depends on the financial supervision strategy of the central government β. If the central government takes punitive measures ($\beta < 0$), local governments will decrease their revenue. If the central government chooses to ignore ($\beta > 0$), local governments will continue to increase the scale of revenue.

Equation (10) can be transformed as

$$\frac{dU_i}{dx_i} = (1-\alpha)\left[\beta + 2b(1-\alpha)\frac{c^2}{x_i}\ln x_i\right]$$
$$+ [\theta_1(1-\alpha) + \alpha\theta_2 - a(1-\alpha)]\frac{c}{x_i}. \tag{11}$$

If $\forall x_i$, there is $dU_i/dx_i < 0$, then β, θ_1, and θ_2 need to satisfy two conditions. Firstly, $\beta < -[2b(1-\alpha)c^2 \ln x_i]/x_i\beta < -[2b(1-\alpha)c^2 \ln x_i]/x_i$; it means that the marginal utility of government revenue is negative, and the central government has strengthened financial supervision. Secondly, $\theta_1 < -[\alpha/(1-\alpha)\theta_2]\theta_1 < -[\alpha/(1-\alpha)\theta_2]$; it means that the marginal utility of GDP government is negative, and local government will choose the industrial upgrading strategy. These two conditions are indispensable. If the GDP development encounters a bottleneck and the central government chooses a loose financial supervision strategy, local governments will still maintain GDP growth by expanding the scale of government revenue. This will lead to unsustainable problems such as land resources mismatch and overcapacity; if the GDP development lags behind and the central government chooses a strict financial supervision strategy, the development enthusiasm of local governments will be reduced. Insufficient fiscal revenue will prevent local governments from providing adequate public services such as healthcare and education.

For the central government, the increase in revenue can improve the level of public facilities such as national defense, infrastructure, medical care, and education and promote economic growth to improve people's living standards. For local governments, the increase in fiscal revenue can achieve

TABLE 2: Composition indicators of USDI.

Indicator	Unit	Connotation	Effects
GDP per capita	RMB	Economic development level	Positive
Green coverage	%	Urban greening level	Positive
Carbon emissions per capita	Ton/p	Energy consumption	Negative
Industrial waste gas emissions per capita	Ton/10000 p	Air pollution	Negative
Industrial wastewater discharge per capita	Ton/p	Water pollution	Negative
Proportion of primary and secondary school teachers	‰	Education	Positive
Proportion of doctors	‰	Medical and health	Positive

the GDP target set by the central government and reduce the deficit. However, development aimed at increasing fiscal revenue has drawbacks. In pursuit of the dual goals of GDP scale and government revenue scale, high pollution and high energy consumption have appeared, and this phenomenon has entered a vicious circle.

In general, the financial supervision strategy and economic development strategy of the central government will affect the decision-making of local governments in industrial structure adjustment and revenue adjustment. Different development stages should correspond to different strategies. In the early stage of economic development, the central government adopts a loose fiscal supervision strategy and a GDP development strategy, and local governments can increase government revenue through the land resources mismatch to develop GDP and provide more public services. As the GDP development encounters bottlenecks, the central government should adopt a strict financial supervision strategy and a sustainable development strategy, and local governments should reduce government revenue, adjust industrial structure, and solve the problem of land resources mismatch.

As China's GDP growth rate declines, the government needs to actively change the way of economic development. Local governments should not rely on developing GDP by land management, especially for the land resources mismatch. Researches show that land transfer marketization can improve the industrial structure and reduce environmental pollution [50–52]. Therefore, local governments should make efforts to control the scale of government revenue, reduce the investment in growth-oriented infrastructure, provide more public services, and support industrial upgrading.

3. Methodology and Data

3.1. Urban Sustainable Development Index (USDI)

3.1.1. Indicators Selection. Studies on sustainability measurement are mainly based on provincial data [53–55]. Based on the perspective of land resources mismatch, the competition between local governments is more obvious. Therefore, this study attempts to measure the level of urban sustainable development. However, multidimensional evaluation can accurately calculate the level of urban sustainable development. However, due to the limited integrity of urban data, we comprehensively consider the integrity and diversity of the data. The basis of data selection is as

follows: Firstly, refer to the SDGs sustainable index evaluation system. Secondly, select widely used indicators. Thirdly, select representative indicators. Finally, we have selected 7 indicators to form an urban sustainable development index (Table 2).

The indicators cover three aspects of economy, society, and environment. All indicators include 292 city data from 2000 to 2019. The carbon emissions data were obtained from the research of Chen [56]. Other data were obtained from the China Urban Statistical Yearbook. The missing data are supplemented by the interpolation method.

3.1.2. Calculation. All indicators need to be normalized to eliminate dimensional discrepancies, and the normalization equations are as follows:

$$x' = \frac{x - x_{\min}}{x_{\max} - x_{\min}}, \tag{12}$$

$$x' = \frac{x_{\max} - x}{x_{\max} - x_{\min}}. \tag{13}$$

Equations (12) and (13) apply to positive and negative indicators, respectively; the standardized indicators are within the interval [0, 1]. However, the geometric mean method with a standardized indicator of zero would result in an SDI of zero. We need to set a minimum value to ensure that all standardized indicators are within the interval (0, 1]. The upper limit also needs to be set for indicators of sustainable development.

The USDI is established using the geometric mean method with reference to the method of the Human Sustainable Development Index (HSDI) [57, 58]. The calculation formula is as follows:

$$\text{USDI} = \sqrt[7]{\prod_{i=1}^{7} x_i}. \tag{14}$$

x_i is the value of the indicator after normalization. The reason for using the geometric mean calculation is that there should be a nonlinear substitution relationship between indicators, and the geometric mean method can penalize cities with unbalanced development [59–61].

3.2. Selection of Explanatory Variables. Explanatory variables include industrial structure (IS), government revenue level GR(GR), and degree of land resources mismatch (LRM). The

proportion of the tertiary industry GDP in different cities in China varies greatly, so the proportion of GDP of the tertiary industry is used to represent the industrial structure.

The government revenue level is represented by the ratio of local government revenue to GDP. Local government revenue includes local governments' general public budget revenue (GPBR), social insurance funds revenue (SIFR), and land revenue (LR).

Land transfer methods in China include agreement, tenders, auction, and listing transfers. Tenders, auctions, and listings for sale can get higher unit prices due to the market-oriented transfer. Therefore, the government will use the lower-priced agreement land to attract investment and then transfer the higher-priced tender auction and listing land to commercial and residential real estate. This way of selling is called land resources mismatch. Firstly, it can develop GDP by attracting investment; secondly, it can increase the local government revenue by raising the market price of land. In summary, the degree of land resources mismatch can be expressed as follows:

$$
\mathrm{LRM}_{it} = \begin{cases} \dfrac{\mathrm{AGR}_{it}}{\mathrm{TAL}_{it}}, & \mathrm{LRM}_{it} \leq 1, \\[2mm] 1, & \mathrm{LRM}_{it} > 1. \end{cases} \tag{15}
$$

AGR_{it} is the unit prices of agreement transfer, and TAL_{it} is the unit prices of tender, auction, and listing transfer. As there is a correlation between annual land revenue and the unit price gap, we believe that the unit price ratio is more suitable for measuring the degree of land resource mismatch than the area ratio, which is different from existing research methods [10, 62]. Normally, land buyers refuse to bear the premium, but due to the small scale of land transfer in some cities, there are special agreements for sales in some years that cause $\mathrm{AGR}_{it} > \mathrm{TAL}_{it}$. Therefore, when $\mathrm{LRM}_{it} > 1$, it means that there is no land resources mismatch.

Since there are many factors affecting the level of sustainable development, the absence of variables will cause regression bias. Therefore, auxiliary variables need to be added to improve the goodness of fit of the model, which can improve the prediction accuracy of the model. We attempted to add population density (PD), geographic location (GL), real estate development level (RED), and average output of industrial enterprises (AOIE) as auxiliary explanatory variables. All these factors will affect the government's decision-making in urban sustainable construction. For example, the local government will plan the number of hospitals and schools based on the city's population density; the local government will plan the proportion of residential, commercial, and industrial land for the next year based on the real estate development situation; the local government will decide whether to close polluting enterprises based on the urban environment. However, adding auxiliary explanatory variables does not necessarily improve the accuracy of the model because the added variables may not be relevant to urban sustainability. We can select the variables based on which combination performs better. If the added variables did not improve the goodness of fit of the model, we chose to ignore these variables.

IS, GPBR, PD, RED, and AOIE data are from China Urban Statistical Yearbook. SIFR data are from China Statistical Yearbook. LR, AGR, and TAL data are from China Land Resources Statistical Yearbook.

3.3. Machine Learning Method-Random Forest.

The random forest model is a kind of machine learning method proposed by Breiman [63]. It consists of multiple decision trees, and each decision tree is independent (Figure 1).

The random forest model is an ensemble learning and bootstrap sampling process; suppose the original sample set contains N samples and M features. Firstly, for each decision tree, repeatedly and randomly select N samples from the original sample set with replacements to generate a new training sample set. Repeated sampling will cause some samples not to participate in the splitting of the decision tree, which is called out of bag (OOB). OOB is used to estimate the misclassification rate of decision trees. For each node of the decision tree, randomly select m features as the split basis ($m \ll M$). Secondly, using the Classification and Regression Tree (CART) with algorithm regressing each tree, the objective function is as follows:

$$
\min \sum_{j=1}^{J} \sum_{i \in R_j} \left(y_i - \widehat{y}_{R_j} \right)^2. \tag{16}
$$

R_j represents dividing the sample into j distinct regions, and $\widehat{y}_{R_j}$ represents the average predicted value in R_j. Different from the traditional CART algorithm, the random forest model requires the decision trees split completely and ensure the integrity of the trees. Thirdly, take the average of all decision tree predictions as the prediction result of the random forest model. Model prediction accuracy is evaluated by root mean squared error (RMSE) and goodness of fit (R^2).

The reasons for choosing the random forest model in this study were as follows: (1) Studies have shown that the relationship between urban development, land resource allocation, and sustainability factors such as air quality, carbon emissions, and environmental pollution is nonlinear. Due to the antioverfitting and antinoise capabilities, the random forest model is widely used in the study of nonlinear problems [64–70]. (2) The construction decision-making process of local governments in urbanization is similar to decision trees in random forests. For example, when land resources are expropriated, how many hospitals should be planned? Hundreds of local governments will make decisions based on urban conditions (Figure 2), and the mean value of local government plans in similar cities is the predicted value.

To improve the accuracy of the prediction results, we use three models for random forest regression. Model 1 is the base model, consisting of USDI, GR, LRM, and IS:

$$
\mathrm{USDI} \sim \mathrm{GR} + \mathrm{LRM} + \mathrm{IS}. \tag{17}
$$

Model 2 adds PD, GL, RED, and AOIE, supplementing other factors affecting sustainable development in the process of urbanization:
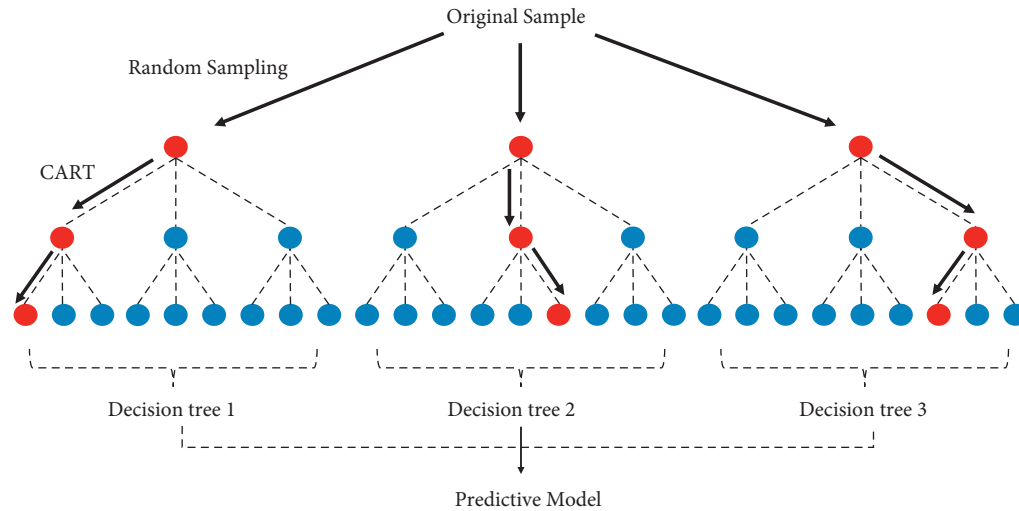
Figure 1: The principle of the random forest model.
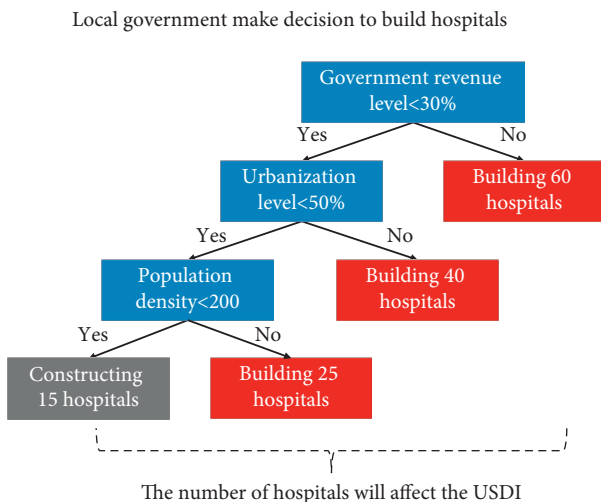
Figure 2: An example of a local government decision affecting sustainable development.

$$USDI \sim GR + LRM + IS + PD + GL + RED + AOIE. \quad (18)$$

Model 3 splits the GR to study the impact of different revenues on USDI:

$$\begin{aligned} USDI \sim{}& GPBR + SIFR + LR + LRM + IS + PD \\ &+ GL + RED + AOIE. \end{aligned} \quad (19)$$

Extreme gradient boosting model (XGBoost) and multiple linear regression (MLR) will be used to test the robustness of all models.

4. Results and Discussion

4.1. Predictive Performance of Random Forest Model. We divide the original sample into two parts: 70% of the data are used for training, and 30% of the data are used for testing. The training set is used for model regression, and the testing set is used to examine the generalization ability of the model.

Table 3 shows that R^2 of the base model on the test set is only 45.9%. By adding auxiliary explanatory variables, R^2 of the test set can be improved to 70.4%. Further splitting the GR improves R^2 of the test set to 74.0%. Compared with the split of GR, the auxiliary explanatory variables have a greater improvement in the fit of the prediction set. The addition of auxiliary explanatory variables significantly improves the generalization ability of the model and reduces the dispersion of the prediction set (Figure 3). The robustness test (Table 3) shows that the performance of the random forest model is better than that of XGboost or MLR.

Figure 4 shows the importance of variables in a different model. In the base model, GR has the highest importance. After adding auxiliary explanatory variables, IS becomes the most important variable in model, indicating that the synergy of AOIE and IS has a higher impact on sustainable development than GR. The increase of AOIE and IS will reduce the discharge of industrial wastewater and exhaust gas, which will affect the USDI. After the split of GR, the importance of LRM has increased, probably because of the synergistic effect with LR. Local governments will increase the LR by changing the LRM strategy. The importance of AOIE decreases, while the importance of SIFR is similar to that of AOIE. SIFR is highly correlated with the number of hospitals and schools, and AOIE is highly correlated with industrial wastewater and air emissions, so both have the same impact on USDI. PD and GL both have great importance to USDI, which has not changed before or after splitting GR. Urbanization will increase the number and density of urban populations, and local governments will improve healthcare and education. China's eastern cities have more permanent residents than registered households, and these cities have higher levels of medical care and education (the medical level and education level variables use the registered population). Therefore, both geographic location and population density of cities will affect USDI. The importance of IS still ranks first, indicating that the adjustment of industrial structure is the most important for the urban sustainable development.

TABLE 3: Robustness test of random forest model.

Model	Random forest				XGBoost				MLR
	R^2		RMSE*		R^2		RMSE		R^2
	Train	Test	Train	Test	Train	Test	Train	Test	
1	0.913	0.459	0.013	0.030	0.526	0.504	0.027	0.027	0.427
2	0.957	0.704	0.009	0.022	0.540	0.474	0.027	0.029	0.506
3	0.958	0.740	0.009	0.020	0.794	0.519	0.018	0.027	0.508

*RMSE is the root mean square error.

(a)

(b)

(c)
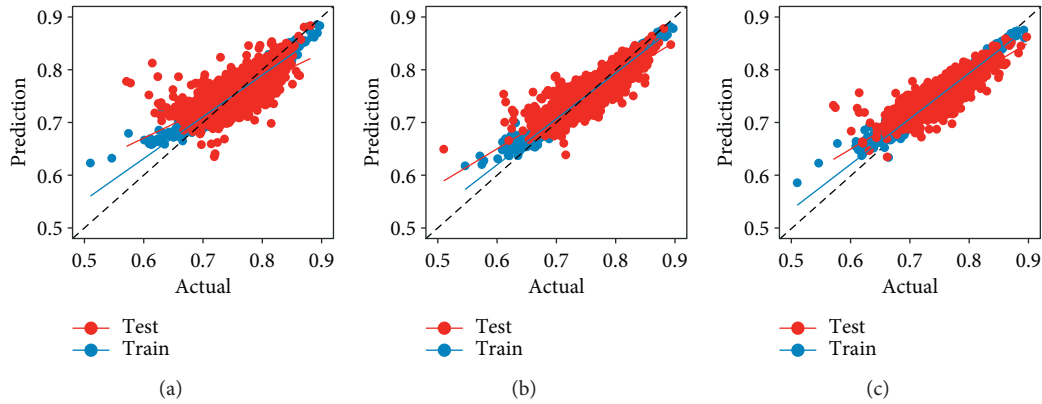
FIGURE 3: The generalization ability of the three models. (a) Representative model 1, (b) representative model 2, and (c) representative model 3.

(a) (b) (c)
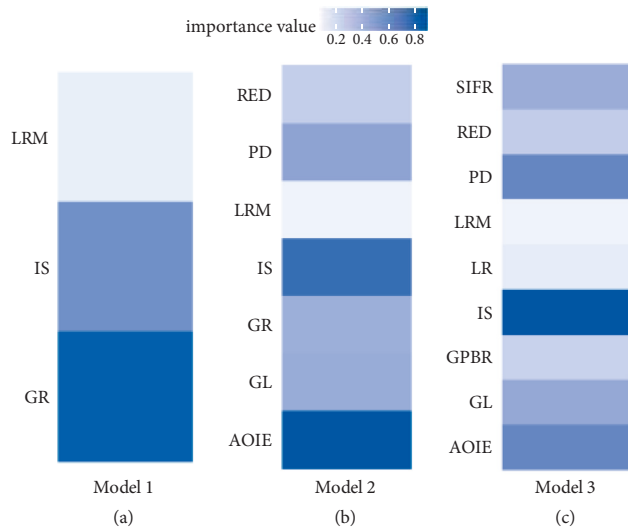
FIGURE 4: The importance of variables of the three models. (a) Model 1, (b) model 2, and (c) model 3.

4.2. Regional Heterogeneity Research. Dividing the data into east, middle, and west for random forest regression further improves the generalization ability of the model, and the performance of the random forest algorithm is better than that of XGboost or MLR (Table 4). Since the random forest model performs better in models 2 and 3, the following studies will exclude model 1.

In model 2, the importance of PD, GR, RED, and LRM in the eastern, mid, and western regions makes heterogeneity (Figure 5). After splitting GR, LRM still shows great

heterogeneity. The importance value of the random forest model is obtained by adding noise interference to the OOB. Therefore, the smaller the importance value of the feature, the stronger the noise of the dataset. The strong noise of the variable indicates that the data tend to be randomly distributed in different years. For policy variables, the strong noise indicates that local governments have large changes in policy designation each year. For example, the importance of LRM in the mid is the highest, indicating that the LRM strategies of the midlocal governments are regular. In contrast, the LRM strategies of eastern and western local governments have great volatility. However, due to the large difference in land prices between eastern and western regions, the LRM strategies of eastern and western local governments should be different. The eastern local government maximizes LR by continuously adjusting the LRM strategy, while the western local government cannot misallocate land resources.

AOIE, IS, and PD show great importance in both models, which verifies the conclusion in 4.1. Regarding the analysis of the theoretical mechanism, PD determines the level of education and medical care in the city, IS determines the level of cities' economic development, and AOIE determines the level of wastewater and waste pollution in the city. The local government should focus on improving these three indicators to increase USDI, for example, reducing the number of agreements and industrial land transfers and increasing the AOIE; actively adjusting the industrial structure and improving the level of local economic development; rationally increasing the construction of hospitals and schools in the process of urbanization.

TABLE 4: Robustness test of random forest model.

Model	Location	Random forest				XGBoost				MLR
		R^2		RMSE		R^2		RMSE		R^2
		Train	Test	Train	Test	Train	Test	Train	Test	
2	East	0.966	0.803	0.007	0.017	0.893	0.792	0.012	0.018	0.667
	West	0.948	0.690	0.010	0.022	0.779	0.648	0.019	0.023	0.480
	Mid	0.957	0.754	0.008	0.018	0.846	0.682	0.014	0.020	0.467
3	East	0.970	0.825	0.007	0.016	0.902	0.796	0.012	0.018	0.668
	West	0.956	0.759	0.011	0.024	0.900	0.731	0.016	0.022	0.413
	Mid	0.959	0.684	0.008	0.020	0.900	0.680	0.011	0.020	0.442
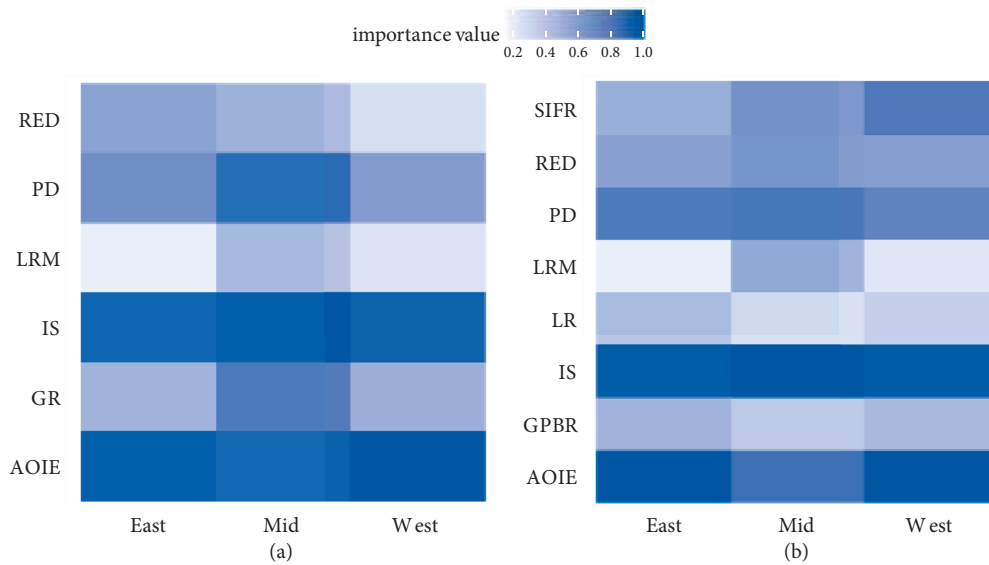
FIGURE 5: The importance of variables of the three models. (a) Corresponding to model 2; (b) corresponding to model 3.

4.3. Representative Urban Agglomeration Research.
Beijing-Tianjin-Hebei (BTH), Yangtze River Delta (YRD), Pearl River Delta (PRD), and Chengdu-Chongqing (CC) are the four most representative urban agglomerations in China. These four urban agglomerations account for 36.3% of China's population and 47.3% of China's GDP. Table 5 shows that the generalization ability of the random forest model is improved by choosing the representative urban agglomerations. The performance of the random forest model is still better than XGBoost and MLR.

Figure 6 shows that IS and AOIE have a strong impact on the USDI of the four urban agglomerations, which strengthens the previous results. The GR of these urban agglomerations has a strong impact on the USDI. Due to the strong ability of land resource control, the local governments will adjust LR and LRM strategies to cover excess spending. Therefore, the impact of LRM and LR in these urban agglomerations on USDI is not obvious, but the GR is contrary. The importance of SIFR in BTH and CCCC is obvious, which is different from YRD and PRD. The RED and PD of the four urban circles are stable in both models.

4.4. Discussion of Results.
From the regression results, IS has the greatest impact on urban sustainable development. Because cities with a high proportion of tertiary industry mean a small proportion of industrial output, there will be fewer emissions of waste gas and wastewater. Therefore, the government should actively adjust the industrial structure to improve the level of sustainable urban development. However, the industry is the foundation of national economic development. Excessively increasing proportion of the tertiary industry will lead to the relocation and loss of manufacturing. Therefore, for cities with a high proportion of industrial output, local governments should focus on improving the output quality and efficiency of industrial enterprises to improve the level of urban sustainable development. The importance of AOIE to urban sustainable development confirms it. Local governments should not continue to increase the number of industrial enterprises through the land resources mismatch but increase output and reduce pollution by providing tax incentives and R&D subsidies for enterprises. Surprisingly, SIFR showed a great impact in BTH and CC and was as important in PRD and YRD as AOIE. Local governments need to work hard to improve the level of urban sustainable development by improving the level of SIFR. However, raising the SIFR level will increase the tax burden for both businesses and residents.

TABLE 5: Robustness test of random forest model.

Model	Location	Random forest				XGBoost				MLR
		R^2		RMSE		R^2		RMSE		R^2
		Train	Test	Train	Test	Train	Test	Train	Test	
2	BTH	0.982	0.896	0.005	0.011	0.951	0.879	0.009	0.011	0.838
	YRD	0.971	0.839	0.006	0.015	0.902	0.810	0.011	0.017	0.676
	PRD	0.980	0.770	0.006	0.018	0.920	0.903	0.011	0.012	0.767
	CC	0.974	0.847	0.007	0.017	0.924	0.846	0.011	0.017	0.632
3	BTH	0.989	0.913	0.004	0.012	0.953	0.911	0.008	0.010	0.903
	YRD	0.967	0.736	0.008	0.018	0.895	0.766	0.012	0.018	0.555
	PRD	0.979	0.889	0.006	0.014	0.949	0.854	0.009	0.015	0.801
	CC	0.975	0.879	0.007	0.014	0.901	0.827	0.013	0.017	0.733
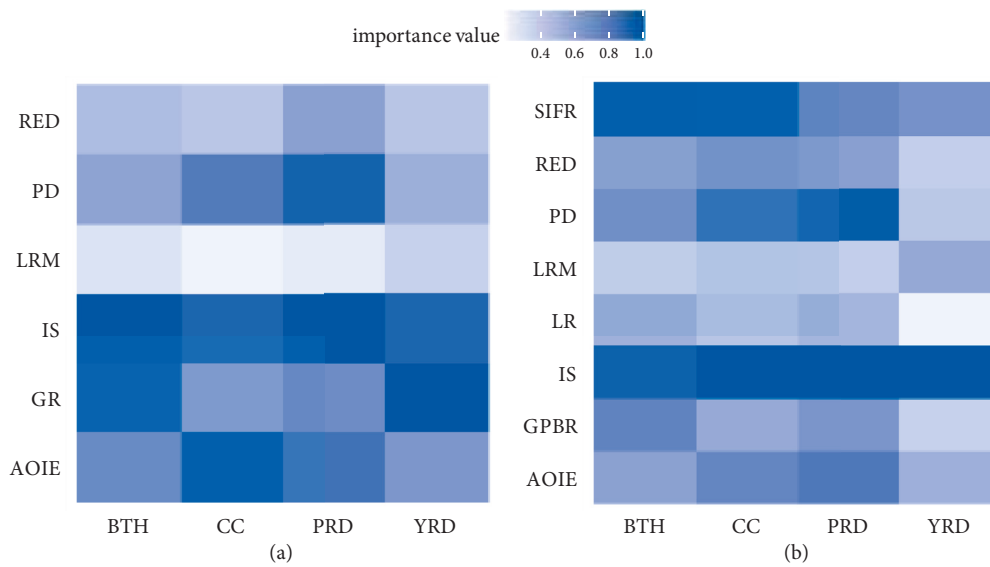
FIGURE 6: The importance of variables of the three models. (a) Corresponding to model 2; (b) corresponding to model 3.

Local governments should find a compromise solution to this problem.

The impact of LRM and LR on urban sustainable development is not as important as expected, probably because the intervention of local governments in land supply makes land prices cyclical. The purpose of local government intervention in land supply is to maximize government revenue, which is confirmed by the importance of GR. The importance of LRM and LR gradually increases as the region shrinks. This shows that the local government's land resource allocation strategy is affected by the neighboring cities.

5. Conclusions

This paper discusses the impact of government revenue expansion, land resource mismatch, and industrial structure adjustment on sustainable urban development in the process of urbanization. Our research shows that the adjustment of industrial structure and the level of local government income have a great impact on urban sustainable development. The importance of land resources mismatch is stronger in representative metropolitan research. The author believes

that land resources mismatch is a measure adopted by local governments to increase the level of income, which is highly cyclical and difficult to detect. The government's influence on sustainable development through land management is reflected in the government revenue.

Urbanization led by local governments will affect sustainable development in many aspects. Local governments will plan land construction after land requisition, including planning the area of industrial, commercial, and residential land, the number of schools and hospitals, public greening, and roads. Land construction planning has different impacts on urban sustainable development. For example, industrial enterprises will cause environmental pollution due to the discharge of waste gas and wastewater; population aggregation will improve the level of medical care and education. Therefore, how local governments plan for land determines the direction of sustainable urban development. Since the reduction in land resources mismatch will reduce the local government revenue, the local government will choose to reduce the expenditure on public services to maintain the speed of economic development. Therefore, the central government should change the promotion incentives and encourage local governments to devote more resources to

urban sustainable development. And the central government needs to undertake the corresponding sustainable development construction tasks instead of handing all the tasks to the local governments. This is because the local government adopts a fiscal expansion strategy due to the excess construction tasks. After the central government's incentive mechanism changed, local governments should formulate development strategies according to the industrial structure of the city, not just maximizing the speed of economic development and maximizing government revenue. In the process of industrial transformation and upgrading, the normal operation of the urban economy must be ensured first, and blind and radical strategies should not be adopted.

In addition, local governments should be committed to improving the level of social insurance income in cities, but they should not increase the tax burden on businesses and residents. We think the best way is to let state-owned enterprises take this responsibility. Due to the government's endorsement, state-owned enterprises have advantages over private enterprises in financing and procurement. Therefore, state-owned enterprises are equivalent to enjoying the preferential treatment of market resource allocation. The specific plan is to transfer part of the annual profits of state-owned enterprises to the social insurance fund.

Our study shows that random forest models perform better in government decision-making problems, but how to select variables to measure the level of urban sustainable development more accurately deserves further research. In future research, we will further improve the urban sustainable development index system, and the measurement of land resource mismatch will also adopt a variety of methods.

Data Availability

All data used to support the findings of this study are included within the article.

Conflicts of Interest

The author declares no conflicts of interest.

Authors' Contributions

Yixiao Peng contributed to conceptualization, methodology, software, formal analysis, data curation, original draft preparation, and visualization.

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Research Article

An Investigation and Analysis of College English Majors' Autonomous Learning Ability in Ubiquitous Learning Environment

Tao Chen ⬤

School of Foreign Languages, Wuhan University of Science and Technology, Wuhan 430081, Hubei, China

Correspondence should be addressed to Tao Chen; chentao@wust.edu.cn

In order to solve the problem that there are many places with poor learning ability of college English majors, this study conducts research, evaluation, and research on many places with poor learning ability. The independent learning ability of college students in different majors is obviously different, and majors affect the independent learning ability by 24.2%. Developing students' ability to succeed is a hot topic in teaching and learning. This study examines the self-learning ability of English majors in multiple subject areas by means of questionnaires and interviews. The study found that most UK adults had good self-control, but they showed improvements in self-planning, literacy and communication skills, and collaboration skills. The overall self-control ability is at a medium level and needs to be improved. At the same time, it discusses the necessity of improving learning ability and self-discipline in different learning environments, as well as strategies for improving academic ability, providing important guidance for supporting the academic development of the college new student. Compared with elementary and high school, the breadth and depth of knowledge acquired in school have expanded beyond textbooks. Classroom sound is fast and informative, requiring students to spend a lot of time after class to digest and understand. If students do not perform well in college, the process of assimilation and acquisition can be disrupted. In the case of data being cracked, it is difficult to meet the needs of work due to insufficient learning ability or even to meet the needs, which is based on improving the relationship. For example, it is critical to develop and enhance the ability of college students to succeed in a variety of settings.

1. Introduction

The student years are the best time to develop independent skills. Schools should not only continue to optimize their teaching environment but also focus on using technology-based teaching environments, such as online teaching and guidance, to not only improve students' independent learning skills but also to reduce carbon and develop their environmental awareness. Students with excellent self-directed skills are often enthusiastic about life and have a goodwill toward society. They are more likely to be involved in environmental activities and to motivate others to take part in them. By learning English, they can be more involved in international environmental platforms and play a greater role.

As soon as the concept of independent education was put forward, it became an important value of education in many countries. China has also made confidence in the education revolution a key goal. The theme of the national medium and long-term education reform and development plan for 2010–2020 is to vigorously promote independent education, participatory education, and scientific education, lay a legal foundation for permanent public education, and build an educational community. The 2010–2020 National Medium and Long-Term Education Reform and Development Plan outlines that education is the key to education. Human resources are the main source of capital for China's economic and human development, and education is an important way to improve human resources. We must take students as an important role, and teachers must guide, provide students with activities to give full play to, support student development as the starting point and goal of all school activities, let all students improve actively and vividly,

respect the right to education and the rights of students' physical development and mental health, and provide all students with an appropriate education. There are hundreds of millions of skilled workers, tens of millions of professionals, and many senior technicians. At present, there are two problems in the research on autonomous learning of college English: almost all the research studies applied to autonomous learning of college English are based on the principle of borrowing concepts from different subjects. Ethnic self-directed education and research do not define mission conditions. In college English teaching, most research focuses on how to improve the success of English students through the concept of instructional modification and instructional strategies. To date, there has been no academic work on improving English students' learning abilities by taking into account the development of college English literature. This study aims to make an effort and try both, as shown in Figure 1.

2. Literature Review

A large number of research experiments show that both humanistic pedagogy and constructivist pedagogy show that cultivating the potential of autonomous learning is a historical goal that modern education must achieve. The rapid development of society requires learners to adapt to the changing world of the future. The potential for independent learning is crucial. It can help students expand their life options, which are theoretically an important part of self-study. The rapid development of science and technology provides equipment for autonomous learning. The design and production of tape recorders, video recorders, and television sets make it possible for foreign language learners to learn the target material. Most of the free language learning centers created in Europe and America rely only on these materials. These programs and self-help centers have been extensively developed to provide language learning options. Students can take classes or special education classes depending on their circumstances. In particular, the rapid development of global computer networks has made distance learning and learning a reality. It also plays an important role in creating a language learning environment and promotes the development of autonomous language learning [1].

From 1960 to 1970, Lin and Huang analyzed and researched the English autonomous learning ability of college freshmen. The analysis of disinformation mainly focuses on the definition, function, and role of disinformation and the relationship between disinformation and specific data, including the development and research of implicit curriculum [2]. Initially, based on theoretical concepts and arguments, he continued to develop his own interpretation, identify the relationship between false information and data, clarify, and develop his own theoretical system, with a focus on the United States, status from 1960 to 1970. Then, it developed rapidly in Europe, Asia, and Africa and created many scientific secrets. For example, Zhu and Fei established a theoretical school, which is a critical relational school, a clinical expression school, and a functional
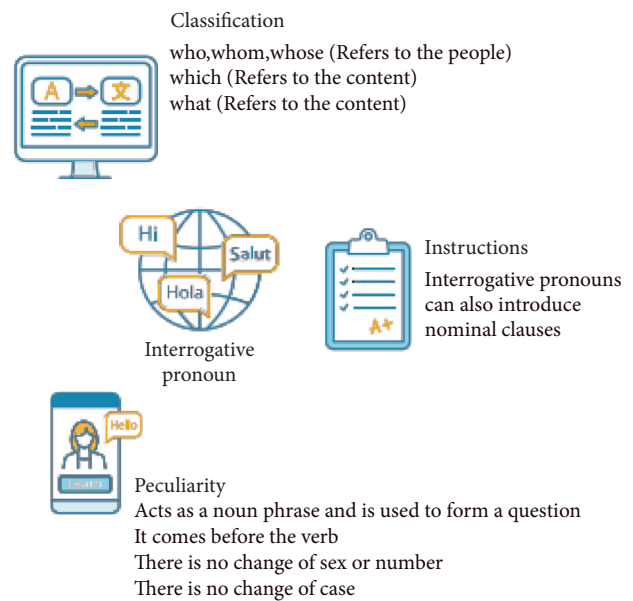
FIGURE 1: The independent learning ability of college English major freshmen.

school [3]. During this period, Burns Sardone and Summary Jun conducted scientific research from different angles, including all kinds of confidential information, such as class secrets, documents hidden in teaching documents, hidden English passwords, and hidden experimental data [4]. From the first stage of research to the present, the research on implicit foreign learning materials has never stopped, and many scholars have emerged, such as Kalaee et al. [5].

On the basis of the present, this study puts forward the research on the self-learning capital of English for freshmen in different environments. The internal and external directions of foreign language learning are independently coordinated and determine the degree of recognition of foreign language learning [6]. The ability to use "external guidance" on a case-by-case basis to identify individualized education competencies will assist school policy, school management at all levels, administrators, academics, and educators working to improve students' knowledge and ability to learn independently. Carefully supervising the development of the external direction of autonomous learning and actively improving the environment and necessary equipment for autonomous learning can promote the design and development of learners' awareness of autonomous learning and autonomous learning ability [7].

3. Research and Analysis on the Construction of College English Learning Environment

3.1. Research on Language Learning Strategies Based on Web-Based Autonomous Learning. In the 1980s, many foreign scholars studied academic science. Learners are trained in collaboration, which effectively helps learners to remember; at the same time, the combination of metacognition, knowledge, and effective training also attracts researchers [8]. However, with the rapid development of network

technology, research on language learning strategies based on network autonomous learning has begun to attract foreign learners. The researchers say that learning a second language in the classroom requires the support of teachers themselves, and teachers should help students develop their experience by completing different tasks online [9].

3.2. Meaning of Autonomous Learning.

Since the introduction of self-directed education, although there are more and more scholars, there has been no generally accepted comprehensive definition [10]. Professor Zimmerman, a famous American self-taught scholar, outlined three main points of self-study: motivation and attitude; self-education is a way of expressing self-esteem. It is believed that independent learners can monitor the benefits of their learning strategies and improve their learning based on this guidance; independent learners know when and how to use specialized learning strategies or respond appropriately [11]. Many domestic scholars believe that self-study generally has three main points: self-study is a synthesis of learners' abilities, learning attitudes, and educational strategies [12]. In fact, it can also be said that it is the learner's ability to guide and monitor their own learning and measure performance. Self-directed learning means that students freely choose their own educational goals, learning, learning, and learning content or are exempt from the free choice provided by the learning mechanism [13]. Self-directed education is a course in which specific learning goals are formulated according to the characteristics and needs of students or according to the teaching of teachers, and the learning goals are achieved through their personal efforts, as shown in Figure 2.

3.3. Autonomous Learning of College Students.

The education of college students is different from primary and secondary schools and depends on teachers' planning and guidance. There are many student periods in universities, but more are acquired through student self-learning [14]. Self-directed learning provides options for college students. They can plan lessons according to their needs without affecting the lessons planned by teachers. When college students study problems by themselves, they need to acquire knowledge in various ways and find the answers to the problems. At this point, teachers should be very supportive of students' individual learning and provide students with additional training and support [15]. Therefore, what college students need for independent education is a kind of academic support. Self-directed learning can not only improve skills, improve students' college knowledge, and improve academic performance but also an important way for students to succeed, allowing college students to recognize their self-worth and promote their own development [16]. On the other hand, in the process of autonomous learning, college students take the initiative to set learning goals, use mobile devices to select appropriate resources, achieve goals, seek help from others through their own efforts or exchange learning, improve students' academic performance, improve their communication and coordination skills, and complete their major academic training. At the same time, also understand
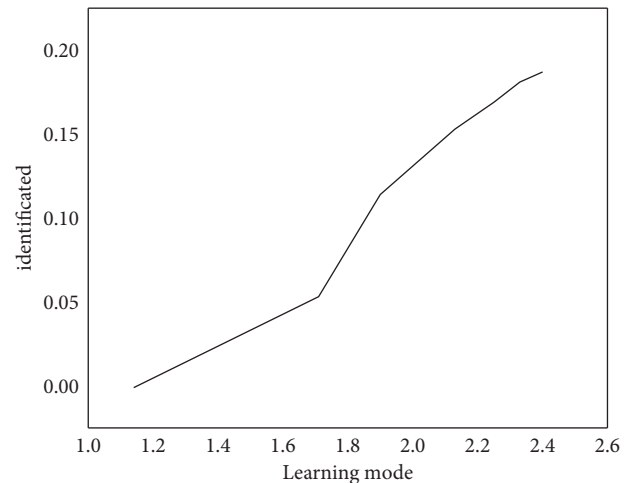
Figure 2: Published annual trend chart.

the school's personal training of students [17]. On the other hand, with the continuous improvement of society and the updating of knowledge, if students do not learn new skills to work after graduation, the experience educated in school is just far from being able to complete the work. Therefore, self-directed education is a course that college students should know about and a great way to improve themselves and their goals. Only by continuously learning new knowledge and skills, supporting and improving oneself, can we meet the needs of the society for art [18].

3.4. Constraints of Autonomous Learning.

The autonomous learning ability of college students refers to the ability to learn through their own attitudes, behaviors, and abilities. Behavior is an important factor in learners taking responsibility for their own learning, challenging, willing to change, and learning; behavior-specific, it includes supporting learning, sharing the benefits of learning, and self-fulfilling educational goals, with rules and regulations, and activities carried out. Demonstrate skills, the ability to practice skills, manage practice, and develop study plans. Self-directed learning and the ability to support further learning and interaction, so learning support is an important factor affecting learning ability [19]. From the perspective of learning theory and learning theory, Gu Shimin believes that the foreign languages that can be learned can be limited by direct and indirect effects. Other important aspects of curriculum development include materials and relationships, such as teacher level and skill level; internal orientation conditions include interests, ideas, and initiation 20. Therefore, it is necessary to focus on the development of external orientations of learning ability, improving environmental relationships and education resources to facilitate the formation and development of students' learning abilities. Other scholars believe that the factors affecting learning ability include research ability, collaboration ability, self-awareness, motivated learning, and metacognitive ability. In addition, educators play an important role in enhancing the academic ability of students. Evaluation of related studies [21] is given in Table 1.

TABLE 1: Statistics of factors restricting autonomous learning ability.

Serial number	Author	Year	Restrict autonomous learning ability
1	Candy	1990	Internal characteristics
2	Bincp	1990	Personal characteristics, self-setting goals
3	Gamson	1996	Emotion, self-monitoring ability
4	Riedp	2000	Autonomous learning ability is manifested in attitude
5	Chen Shihong	2001	Objective factor
6	Feng Lvquan	2001	Information ability

4. Experiment and Research

4.1. Exploratory Factor Analysis of Questionnaire.
Make key points of the measured data, subtract the values, and get the initial load matrix. Since there is a certain correlation between the lengths of the degrees of freedom, the rotation of the load matrix is obtained using the maximum difference. According to past experience and analysis, the number of events is determined according to the following criteria: type characteristic value > 1; each item contains at least 2 items; excluded content is easy to register. Finally, eight items were identified [22], as given in Table 2.

4.2. Quantitative Study on the Current Situation of College Students' English Autonomous Learning Ability

4.2.1. Variance Contribution Rate of Each Dimension of the Current Situation of Students' English Autonomous Learning Ability.
Square the loading value of each dimension for each dimension and then calculate the variance of each dimension. The difference of different sizes, according to the score, is education > self-discipline > learning   motivation > student evaluation > communication ability, which shows that everything has different abilities and self-training performance. Learning strategies were the highest and coeducational abilities were the lowest [23], as given in Table 3.

4.2.2. Lack of Learning Mobility.
The results showed that 56.6% of the students believed that English was a good language and wanted to learn English well; 52.8% of the students believed that they could learn English well; 43.7% of the students said that they did not work in education due to unfortunate or difficult work, which shows that these students are not well-educated; 33.7% of students are worried about failing the exam, which shows that students still have a strong interest in English and confidence in learning English well. At the same time, many students are experiencing severe anxiety. However, we also see from the table that 60.0% of the students are unable to cooperate with the teacher in the classroom, which indicates their personal responsibility and the onset of negative emotions [24], as given in Table 4.

4.2.3. Basic Information of College Students.
Key data for college students include gender, grade, and size. The special points are discussed as follows: among the respondents, 144 were girls, accounting for 46.15% of the total, and 168 were boys, accounting for 53.85% of the total. The distributions of the study data are equal, which suggests that random sampling is scientifically sound [25], as given in Table 5.

Among the respondents, there were 84 freshmen, accounting for 26.92% of the total; 105 graduates, accounting for 33.65%; 45 students, accounting for 14.42%; and 78 graduates, accounting for 25%. It can be seen that there are subtle differences between students, 12th graders, 12th graders, and adults, but there are fewer older students, affecting the majority of students. The data are completely similar, as given in Table 6.

4.2.4. Analysis of the Relationship between Autonomous Learning and Traditional Teaching Elements.
Although the curriculum has always been self-learning, even if the new classroom model is suitable for self-learning, the teacher's role in student learning, the average impact of self-learning is 3.07, slightly above average. 3 in total on average. It shows that most students believe that this teaching method has been unable to effectively improve students' interest in English autonomous learning. However, the benefits of new classroom models, such as group study and seminars, are less than ideal. The reason for the above phenomenon is that students often interpret self-study as their own autonomous learning while ignoring the importance of communication and participation. Participatory learning is an important way to learn autonomous English. Through the collaboration of students, we can not only exchange information but also supervise and compete with each other to improve the learning effect, as given in Table 7.

Guided by the required data, colleges and universities formulate college English teaching syllabus and college English teaching strategies according to the actual situation of the university, decompose the teaching objectives of the university, divide professional courses, and create professional courses. The syllabus usually specifies the teaching content, teaching and organization, and finally the selection of courses and the use of teaching as shown in Figure 3.

Self-directed learning external supervision: self-directed learning supervision can be divided into self-directed learning and extracurricular activities according to the learning situation and objects of concern. Among them, external oversight includes academic support or accountability. The availability of external supervision is gradually reduced or even reversed to improve students' self-discipline and self-directed learning. As an important part of external supervision, supervising teachers play an important role in self-study. As a means of ensuring the effectiveness of

Table 2: Exploratory factor analysis.

Title number	Project	Common degree	Factor load
Factor	The contribution rate of learning strategies (eigenvalue is 1.08) is 12.265		
24	When learning English, try to combine what you usually learn with your existing knowledge	616	650
18	In order to improve their English communication level, I take advantage of various opportunities to train myself	682	542
25	Be able to grasp the key points in listening to English class	544	532
19	Understand the teaching objectives and requirements of teachers in each class	516	554

Table 3: The variance contribution rate of each dimension.

Learning strategy	Learning motivation	Self-management	Student information ability	Teacher information ability	Information resources	Student evaluation	Assist in communication ability
12.263	5.332	6.882	5.103	4.962	4.574	4.023	3.864

Table 4: Learning motivation.

Project	Topic content	Title number	Never	Sometimes	Often	Always
Interest	Feel interested in English	6	9.6	31.2	25.4	19.6
Self-efficacy	English test anxiety	9	7.8	33.2	29.5	5.3
	Believe I can learn English well	10	9.3	34.5	30.6	21.3
Subject consciousness	Actively participate	9	8.5	36.5	31.2	6.3

Table 5: Gender distribution of college students.

Category	Name	Number of people	Percentage (%)
Gender	Male	158	53.85
	Female	133	46.15

Table 6: Grade distribution of college students.

Category	Name	Number of people	Percentage (%)
Grade	Freshman year	74	23.96
	Sophomore year	103	33.64
	Junior college	39	36.22
	The fourth year of college	69	25.33

Table 7: Descriptive statistics.

	N	Minimum	Maximum value	Mean value	Standard value
t24	215	0	4	3.04	1.222
t25	215	0	4	3.06	1.065
t26	215	0	4	2.26	1.325
t27	215	0	4	2.35	1.036
Valid N	215				
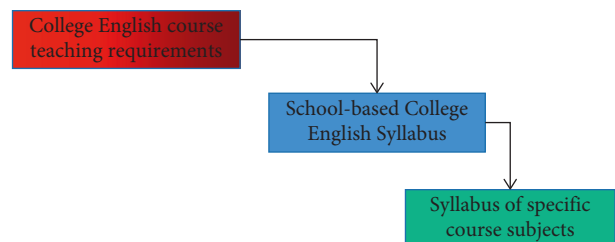
Figure 3: English syllabus.

classroom instruction, it prepares, evaluates, evaluates, delivers, and revises instructional activities throughout the process as shown in Figure 4.

4.3. Students Lack a Correct Understanding of Autonomous Learning Monitoring.
Although most students know that college English education in the online environment must be influenced by all parties on campus, many students still think that self-directed education is self-employed and teachers should not interfere too much. 65% met the conditions, 52.8% generally met the conditions, and 12.2% of the students believed that teachers should not interfere too much. The above data show that students do not have a good

understanding of autonomous learning in an online environment, which may have a certain impact on the assessment results, as given in Table 8.

4.4. Creation Principle of Innovative College English Grammar Teaching Derivation Formula.
Through long-term college English grammar teaching, it is not difficult to find that there is a certain consistency in the principles of college English grammar itself. The concepts in each chapter of college English grammar are independent and interrelated, that is,
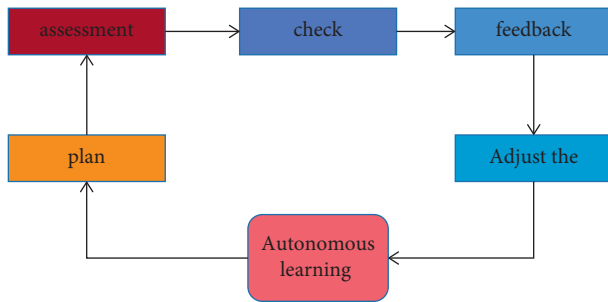
Figure 4: Activity plan.

Table 8: Questionnaire on students' awareness of autonomous learning monitoring.

	Number of people	Percentage (%)
Not suitable at all	15	7.6
Usually not suitable	36	21.1
Sometimes suitable	14	6.3
Usually suitable	23	12.1
Perfect fit	94	52.1

the concepts before and after echo each other and do not exist independently. In particular, there are some common rules that are shared across multiple languages. After years of teaching research and practice, the author has finally found some moving texts of 16 timepieces, sounds, exemplars, and informal texts in college English grammar. They can be connected using designs. As long as people are familiar with these standards, they can identify the various concepts between them and thus develop this outline, which is called innovative college English grammar. The derivation formula is

$$\text{Aux} \cdot (1) + F \cdot V. \tag{1}$$

For example, Wierzbicka believes that in order to show the exact meaning of "punishment," we need to use the following event domain: y is punished because of Z as shown in the following equation.

$$X(\text{punish})Y[\text{for}Z]\cdot = X. \tag{2}$$

4.5. Analysis of the Significance of Differences in the Passing Rate of CET4 in Countries. The 2013 and 2014 prices in a nonforeign language are two separate examples and the significance of the difference between these two rates is being tested. Key specification: if the key is set to 0.05, its theoretical Z value is 1.960. The test statistics assume that P1 = P2 or P1-P2 = 0, that is, there is no significant difference in the CET4 pass test between the two students. The passing score for nonforeign languages was P10 in 2004 and p in 2003. Here, we assume two equals the sum of all. At this time, regardless of whether there is an example of an equivalent model, the error calculation model is shown in the following equations.

$$\sigma_{Dp} = \sigma_{p1-p2} = \sqrt{\frac{(p1p2 + n1n2)(n1q1 + n2q1)}{n1n2(n1n2)}}, \tag{3}$$

$$Z = \frac{(p1 - p1) - 0}{\sigma_{p1-p2}} = \frac{p1 - p2}{\sigma_{p1-p2}} = 2.72. \tag{4}$$

Gunning entered advertising in 1935 and recently discovered that many high school graduates were unable to understand the content of a good newspaper. He explained the reason for this phenomenon because letters in newspapers are full of "clouds" (not necessarily hard). On this basis, it is decided to clarify the relationship between the text and the reader. He developed the nebulizer in his 1952 book The Technique of Clear Writing, which estimated the level of writing. For example, the barometer of text is 12, which means that American high school students can understand it, and the readability of Frog is expressed by the following equation.

$$0.4 = (X_1 + X_2). \tag{5}$$

The Flesch formula uses long words to determine how readable the reader is when understanding the words. Instead, Dale and Chall postulate that a word's readability depends on whether it is included in a list of words that 80% of fourth graders know and that words that are not in the correct word are considered "difficult words." In 1948, they published Dale-Char's formula for readability in the article "Formulas for Predicting Readability," where X_1 is the average number of words in a sentence per 100 words, and X is the number of words greater than or equal to 3, as shown in the following equation.

$$0.1579 = X_1 + 0.0496X_2. \tag{6}$$

Jing Xixing's research is based on the Chinese guide for primary and secondary schools in Taiwan, with a total of 12 grades. Each semester is used according to reading level, with a total of 24 levels. At the same time, it divides words into known words (such as Changyue) and unknown words. From readable options: all words, all sentences, and familiar words as

$$1.1578 = X_1 + 2.1497X_2. \tag{7}$$

Sun Hanyin selected 20 Chinese articles with about 250 words each to conduct a Gestalt test for middle school students. Based on the extracted readability factors and test scores, he created the following formula:

$$3.2578 = X_1 + 3.2496X_2 + 2.486x_3^1. \tag{8}$$

Erda of Fujian Normal University believes that the readability of English is determined by the readability of words and sentences. The legibility of English words is measured according to the order of words in the textbook. In this system, words are divided into eight levels. In the University Edition, the eight levels are the eight levels specified in the outline issued by the State Education Commission. Erda divides the length of English sentences

into four categories. The length of these four types of sentences is 1–15 words in the first category, 16–25 words in the second category, 26–35 words in the third category, and 36 words or more in the fourth category. The readability ratio of

$$\frac{0.9\,(1.25W1 + 2.5W2 + 3.75W3 + 5W4 + 6.25W5 + 7.5W6 + 8.75W7 + 10W8)}{W} + \frac{0.1\,(10S1 + 7.5S2 + 5S3 + 2.5S4)}{S}. \tag{9}$$

In the study of the readability formula, Wang Lei further considers the types of words and Chinese sentence breaks and uses some other readability factors to construct a readability formula, including the number of words, simple words, function words, and clauses, as shown in the following formula.

$$\text{Readability} = 72.748 - 0.462X_1 + 0.802X_2 \\ - 7.515X_3 + 2.466X_1. \tag{10}$$

Stenner, Smith, and Burdick (1983) analyzed more than 50 semantic variables and found that word frequency is the best operation for reading semantic components. Therefore, they chose two variables, word frequency and sentence length, to form their formula, as shown in the following formulas.

$$\text{The Lexile} = [(\text{Logit} + 3.3) \times 180] + 200, \tag{11}$$

$$\text{Logit} = (9.82247X_1) - (2.14634X_2) - \text{constant}. \tag{12}$$

4.6. Adaptive Principle Analysis. In the adaptive model, writing the model, learning the model, and modifying the model are the three main modules. Therefore, Xahm describes the corresponding changes to the registration model, the design model, and the learning model, so that the rationale for using the change model in the model can be explained with more reason and clarity. About the preset mode, the compiler itself presets various themes according to different technologies, corresponding to the "preset" mode of EAC and PD. This "preset" isolation will create corresponding navigation lighting for users of various aluminum panels. Determine each lead plate group based on the average result of the shortest path, the average length of the shortest path, and the number of lines of the desired graph, as shown in the following equation.

$$S(k) = \frac{\beta_0\mu(k) + \beta_1 n(k) + \beta_2 p(k)}{\beta_0 + \beta_1 + \beta_2}. \tag{13}$$

Learner model: the learner model can be updated every time the learner requests a link. Of course, the update frequency or time interval can also be customized. When the learner passes through a specific path ruler and requests the next node RR, the degree of coupling between the learner and each lead plate category is judged according to the probability that the ruler belongs to the domain path corresponding to a lead plate category *K*, the

vocabulary to sentence is calculated to be 9 : 1 by asking students to judge. The readability of text should know the values of at least 14 variables, as shown in the following formula.

probability of selecting the next node R through this path, and the time spent in the domain path corresponding to each lead plate category *K*, as shown in the following formula.

$$d(k) = \frac{\alpha_0 c(k) + \alpha_1 r(k) + \alpha_2 t(k)}{\alpha_0 + \alpha_1 + \alpha_2}. \tag{14}$$

Overall model: according to the user's initial lead plate type, the user's current lead the plate membership model a (*k*), and (*k*), and D (*k*), determine which lead plate type the user should give, and recommend the domain learning path corresponding to this lead plate type to him/her, as shown in the following formula.

$$A(k) = \frac{\gamma_0 A_0(k) + \gamma_1 A(k) + \gamma_2 d(k) + \wedge\gamma_3 s(k)}{\gamma_1 + \gamma_2 + \wedge\gamma_3}. \tag{15}$$

Xahm's learning standards are generally considered to be based on knowledge level, learners' educational data, and considerations of saving and checking time. On the basis of the curriculum, we add concepts such as skills, standards, environment, and curriculum, which will help create a better learning environment. Knowledge level refers to the advanced level of all knowledge in the registration system, which is the process of competitive pricing.

$$\text{knowledge Level} = \{(k_1, h_2)Ik, \in AD, h, \in H\}. \tag{16}$$

4.7. Current Situation and Characteristics of College Students' Autonomous Learning Ability. In order to determine the critical state of college students' learning self-efficacy, a statistical analysis of the mean and standard deviations of college students' autonomous learning ability and its dimensions was carried out. The specific results are given in Table 9.

4.7.1. Differences in Self-Directed Ability. To determine differences in behavioral potential among students of different genders, grades, and sizes, this study made model D experiments independent and one-way. ANOVA was performed on the behavioral potential of college students of opposite sex, grade, and size. Detailed study results are given in Tables 10–12.

4.7.2. Differences in Self-Selection Ability. In order to determine the differences in the self-selection potential of college students by gender, grade, and size, this study made the model D experiment independent and one-way, and the

Table 9: Distribution of college students' autonomous learning ability.

	Self-orientation	Self-selection ability	Self-regulation ability	Self summarizing ability	Autonomous learning ability
Mean value	3.1888	3.2455	3.3220	3.1240	3.1200
Standard deviation	0.7365	0.7750	0.7561	0.7356	0.6236

Table 10: Comparison of differences in self-orientation ability of college students of different genders.

Dependent variable	Gender	Number	Mean value	Standard deviation	T value	N2
Self-orientation	Male	167	3.0354	0.76452	−0.3014	0.039
	Female	134	3.3640	0.54688		

Table 11: Comparison of self-orientation ability of college students in different grades.

Dependent variable	Grade	Number	Mean value	Standard deviation	F	Multiple comparison	Correlation strength
Self-orientation	Freshman	83	3.1330	0.6345	27.81	4 > 1 > 3	0.164
	Sophomore	106	3.0366	0.5675			
	Junior	44	3.1667	0.4354			
	Senior	76	3.3456	0.5637			

Table 12: Comparison of self-orientation ability of college students in different majors.

Dependent variable	Major	Number	Mean value	Standard deviation	F	Multiple comparison	Correlation strength
Self-orientation	Literature and history	125	3.142	0.7602	10.56	2 > 3 > 4	0.253
	Science and engineering	152	3.126	0.7423			
	Arts	24	3.392	0.7452			

Table 13: Comparison of self-selection ability of college students of different genders.

Dependent variable	Gender	Number	Mean value	Standard deviation	T value	N2
Self-selection ability	Male	165	3.212	0.845	−3.212	0.032
	Female	133	3.214	0.625		

Table 14: Comparison of self-selection ability of college students in different grades.

Dependent variable	Grade	Number	Mean value	Standard deviation	F	Multiple comparison	Correlation strength
Self-selection ability	Freshman	83	3.124	0.425	40.61	3 > 4 > 1	0.156
	Sophomore	104	3.214	0.345			
	Junior	43	3.124	0.654			
	Senior	76	3.456	0.745			

Table 15: Comparison of self-selection ability of college students of different majors.

Dependent variable	Major	Number	Mean value	Standard deviation	F	Multiple comparison	Correlation strength
Self-selection ability	Literature and history	165	3.212	0.786	32.64	4 > 2 > 3	0.113
	Science and engineering	154	3.542	0.674			
	Arts	22	3.458	0.825			

analysis of variance of college students selected the self-potential of gender, grade, and size. Detailed study results are given in Tables 13–15.

This study will use the potential of self-study and its length as a distinction between college students and college students as an independent exchange of ANOVA methods. Different majors have different self-learning abilities, and majors have a 24.2% impact on proficiency. In various fields of learning ability, there are significant differences in the product distribution of behavioral ability, self-selection

ability, self-control ability, and self-discipline ability. After many comparisons, it is found that in terms of behavioral ability, self-selection ability, and self-control ability, students' pressure on information and history is greater than that in science and engineering and art, but in terms of personal potential. Art college students are not just literature and historical art. Majors described 27.5% change in self-efficacy, 26.7% change in self-efficacy, 16.4% change in self-efficacy, and 12.4% change in self-efficacy.

$$\sigma_{DP} = \sigma_{p1-p2} = \sqrt{\frac{(n1p1 = n2p2)(n1q2 + n2q2)}{n1n2(n1 + n2)}} = 0.058. \quad (17)$$

5. Conclusion

The four main definitions of self-directed education are that the purpose and form of self-directed education are different at different stages of development, the environment in which self-directed education occurs is also quite different, and the degree of self-government also has many differences. The data reflection of self-learning also reveals many characteristics. The interplay of these events makes it difficult for scientists to agree on the meaning of autonomous learning. Therefore, there is a conflict between the "status view" of foreign independent education, the "potential view" of foreign independent education, and the "psychological view" of independent study abroad. The "approval" of foreign independent education, the "environmental view" of foreign independent education, the "potential" learning of independent education, and the "critique" of independent learning of foreign education are harmonious. The characteristics of Chinese foreign language education are "see" and "see." We discuss the impact of the external social environment and objective data on learning from the perspective of the relationship between learning and the environment. The ability to use "outreach" means more self-learning, and self-directed learning means the type of cognition and ability that learners engage in language learning and desire to take responsibility for their own language learning; the ability to apply effective language learning strategies and the ability to develop the material and relationships that foreign language learners need to become proficient in the language. This is the first new advance in this study and the basis for all studies. It is the responsibility of students to adapt freely to the external environment, overcome the negative effects of learning English as a foreign language in China, create the best second language learning environment, and improve the achievement and effectiveness of autonomous English learning. However, learners face the main role of being a human being when their abilities are insufficient. In language learning, schools, communities, governments, schools, and educators have a responsibility to play a key role in improving the quality of learning and creating an enabling environment. Learn languages, better integrate into students' internal environment, socialize, and promote growth. Ability to study independently abroad. How to improve external guidance by creating English language courses, create a good English language environment for English learners, improve the nature of knowledge and skills of self-study, and support the completion of college English courses are the key issues that this research strives to solve and address solution.

Data Availability

The dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

The Reform of Basketball Curriculum Model for Students' Physical Development under the National Fitness Environment

Hui-chao Li and Shun-fa Shen (ID)

Department of Physical Education, Civil Aviation University of China, Tianjin 300300, China

Correspondence should be addressed to Shun-fa Shen; sfshen@cauc.edu.cn

College sports serving national fitness are a complex system. College sports are an important part of national fitness. Basketball curriculum, as a subsystem of college sports, has always been loved by college students. The reform of college basketball curriculum mode is an important way to explore the coordinated evolution of college sports subsystem. Through the methods of questionnaire, interview, and mathematical statistics, aiming at the problems existing in the planning and design of basketball curriculum objectives and contents in colleges and universities, this study puts forward that it is necessary to establish a scientific and reasonable basketball special curriculum objective system and then combine the basketball curriculum teaching theory with the basketball training teaching mode, to cultivate students' practical application ability, and adopt a variety of teaching methods to cultivate students' practical ability. Finally, the teaching mode of basketball is improved. Through an example, the application effect of the basketball curriculum model under the background of national fitness proposed in this study is tested. The results show that the basketball curriculum teaching model proposed in this study has certain feasibility and effectiveness.

1. Introduction

The introduction of a series of sports laws and regulations, such as the Outline of the National Fitness Program and the Sports Law, shows that the state attaches great importance to national fitness. With the promotion of national fitness, the relationship between college physical education and national fitness is becoming increasingly close and has become a key topic of research. Coordinating the relationship between college physical education and national fitness has become the foothold of implementing the national fitness plan, which has attracted extensive attention at home and abroad.

In recent years, domestic scholars have focused on the supply-side reform of college sports. As an important part of the "Healthy China" strategy, school physical education has always been a key field of the development of the party and the country [1]. Some people analyzed national fitness and college physical education reform, focusing on the direction of college physical education promoting national fitness

reform [2]. Some scholars focused on improving the teaching mode of physical education in colleges and universities and enhancing students' fitness awareness in their research on ways to promote national fitness in college physical education [3]. Most of the above studies involve macro-factor analysis and lack of in-depth research at the level of physical education curricula in colleges and universities, but they provide the basis and reference for this study.

As the demand for sports is more extensive, colleges and universities should set up some sports courses to meet the needs of social development, so that college sports can meet the development of national fitness needs. In view of the above research results, through the method of questionnaire survey, interview, and mathematical statistics, this study puts forward countermeasures and suggestions for the present problems in the planning and design of the objectives and content of college basketball curricula and gives a school basketball curriculum model under national fitness context.

2. Analysis of the Relationship between College Physical Education and National Fitness

At present, the progress of the society has put forward higher requirements for the physical quality of people, and there are still many problems in the development of the national fitness work. To further develop the national fitness project, the supply of college physical education resources is needed. The relationship between college physical education and national fitness is getting closer and closer. College physical education resources become the running starter of national fitness, which has obvious influence and long-term benefit on national fitness. The development of national fitness is influenced by the technical guidance, information exchange, organization and management, and cultural inheritance of college sports resources. College sports resources provide human reserve and technical guidance for the development of national fitness [4].

In recent 10 years, the number of students in colleges and universities in China has been increasing year by year. In 2021, the total number of students in various forms of higher education in China is 41.83 million [5], and college students are an important force in the cause of national fitness. As the last station of physical education, scientific and reasonable college physical education can not only fully mobilize the enthusiasm of students on sports and enable them to master 1 or 2 lifelong sport projects but also cultivate students' view of sports and health and promote the achievement of teaching goals. College graduates entering the society input more sport resources for the society, create a stronger sports atmosphere, and better promote the development of the national fitness cause. Therefore, it is inevitable to require the continuous development and perfection of college physical education curriculum for the vigorous development of the national fitness movement.

According to the above analysis, the structure chart of the relationship between college physical education curriculum and national fitness is constructed, as shown in Figure 1.

College physical education can not only cultivate students to participate in sports in different ways but also promote the demand of national fitness. College physical education should pay attention to open teaching, comprehensively improve students' comprehensive quality, and establish the idea of lifelong participation in physical education.

3. Current Situation and Existing Problems of Curriculum Construction

3.1. Current Situation of Curriculum Construction

3.1.1. Teaching Materials and Curriculum Construction. Ministry of Education mentioned in Give Priority to Education that talent cultivation and moral composition need to grasp the characteristics of the quality-oriented education era and focus on the construction of teaching materials and teaching reform in primary and secondary schools and colleges [6]. Some people pointed out that the setting of
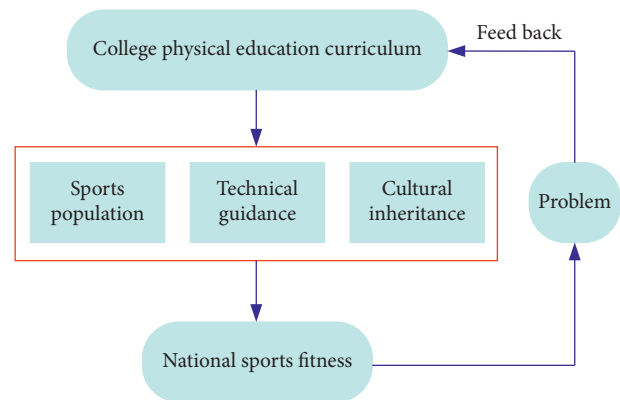
Figure 1: Relationship between physical education curriculum and national fitness system in colleges and universities.

physical education courses in universities should consider the needs of students, start from their physical and mental characteristics, and aim at cultivating interest, stimulating interest, and forming lifelong sports habits [7]. At present, the teaching content of basketball in China mainly consists of basketball theory, basic techniques, tactics, special physical qualities, and teaching competitions. The teaching content is reasonable, but the content is not deep enough, with high repetition with primary and secondary school courses and no special basketball teaching material. Some scholars believe that quality requirement has become the new task of physical education teaching reform and is also the imperative goal of innovation in the. The creation and compilation of textbooks do not take into account the cultivation of students' personality, expertise, and interests, which is not conducive to the formation of exercise methods and habits suitable for students according to the knowledge of textbooks [8]. Through the investigation of 8 colleges and universities in Tianjin, Hebei, Beijing, and Shandong, it was found that the introduction of the subjects in college physical education textbooks is too general and that there are no detailed technical and tactical training methods, playing a very limited auxiliary role in teaching.

3.1.2. Assessment Content and Scoring Standard. According to the Opinions of the General Office of the State Council on Strengthening Physical Education in Schools and Promoting All-Round Development of Students' Physical and Mental Health, physical education course assessment should highlight process management and comprehensively evaluate students' attendance, classroom performance, health knowledge, sports skills, physical health, extracurricular exercise, and participation in activities. Some people pointed out that the current physical education teaching evaluation system in China ignores the differences between individual college students due to innate genetic factors and acquired development factors and ignores the efforts of students in the learning process, which are unhealthy and unfair teaching evaluation [9, 10]. At present, the examination content of basketball skills in colleges and universities lays too much emphasis on the mastery of basketball skills

but lays no emphasis on their ability to participate in basketball games, which is not conducive to the cultivation of students' sports habits. The straight and curve dribbling and three-step layup are taken as an example; the technical score accounts for 90 points, and the hit rate accounts for only 10 points. As we all know, the most important thing in basketball court is to score. In fierce confrontation, it is impossible to achieve the standard of technical movements every time. Therefore, overemphasis on "technical evaluation" is not conducive to stimulate students' enthusiasm in practice and the formation of students' sports habits.

3.2. Reflection on the Construction of Basketball Curriculum in China

3.2.1. Basketball Course Teaching Content.
School physical education curriculum is an important way to improve national physical health. The party and the state attach great importance to youth physical education and successively introduced the Outline of Teaching Guidance for Physical Education in National Colleges and Universities, the Curriculum Standard for Physical Education (Grades 1–6), and Physical Education and Health (Grades 7–12) in General Senior Middle Schools of Full-Time Compulsory Education, Decision of the CPC Central Committee and the State Council on Deepening Educational Reform and Comprehensively Promoting Quality Education, and other documents. On the whole, physical education in schools in China has built a complete teaching system and stipulated the teaching content for all ages [11]. However, when planning the teaching contents of physical education courses, the teaching departments did not make overall arrangements for the progress of primary schools, middle schools, and universities, which not only resulted in the phenomenon of repeated teaching contents but also difficult to meet the actual needs of national fitness, as shown in Table 1.

Table 1 shows that there are two problems in current basketball teaching in schools. First, there are many repetitions in basketball teaching in colleges and middle schools. Basketball skills are mostly personal skill training, and there is a lack of interactive units between students. At the university level, students should be taught the correct application of basketball skills to improve the tactics in the game. For example, the layered method can be adopted to carry out teaching competitions for students at the same level of basketball skills to increase their interest in learning [12]. Second, the means of assessment are relatively simple. The assessment contents of the middle school stage include 1-minute jump shot, three-step layup, and two-handed chest passing and that of the university stage include free throw line shooting and the straight and curve dribbling followed by a three-step layup. In terms of difficulty, the fixed-point free throw is even less than one-minute jump shot. Basketball is a team game, and only in a team can experience the fun of basketball [13]. Therefore, it is necessary to improve the assessment of students' technique and tactic application. Only by adapting to the needs of actual combat can students increase their enthusiasm for sports participation, increase

their sense of achievement, make basketball have the opportunity to become an alternative project for students' sports leisure, and cultivate students' concept of lifelong sports and health.

3.2.2. Student Information of Basketball Option Class.
The basic basketball exercise level of students in the basketball option class determines the teaching content, teaching progress, and the application of teaching methods. The teaching content of teachers can achieve the teaching objectives only by fitting the reality of students and through classroom practice. A total of 550 questionnaires were distributed, and 541 valid questionnaires were collected from 8 colleges and universities in Tianjin, Hebei, Beijing, and Shandong. The findings are as follows.

(1) Time for Students to Contact Basketball. It can be seen from Figure 2 that 41.9% of the students have more than 3 years' experience of touching the ball, and 25.8% of them have 1–3 years' experience of touching the ball. It is worth noting that more than 22.7% of the students have less than 1 years' experience, and even 9.6% of the students have never touched basketball. It is very challenging for us to carry out basketball teaching and develop students' interest in basketball.

(2) Self-Assessment of Basic Basketball Level. As can be seen from Figure 3, students are not very satisfied with their basketball skills. Among 541 students, only 16% think their basketball skills are good or very good, while 42% think their basketball skills are poor or very poor. Therefore, we can infer that although 67.7% of students have more than one year's contact time with basketball, they just use basketball as physical education, but not as leisure sports.

(3) Number of Times Students Participate in Basketball Every Week. As shown in Figure 4, except for the basketball class once a week, only 31.2% of students take basketball as a physical exercise, while 68.8% of students only take part in basketball exercise once or never after class. We have carried out basketball education and teaching for more than ten years, but it remains a course for most students. They did not translate basketball sports into physical exercise and did not make basketball a priority.

(4) Students' Motivation in Basketball Option Class. As can be seen from the statistics in Figure 5, 94.7% of students actively choose basketball lessons, indicating that students have a strong interest in and expectation of basketball lessons.

(5) Students' Expectation to Participate in Basketball through the Learning of Basketball Class. It can be seen from Figure 6 that students have great expectation to participate in basketball after learning basketball courses. 81.8% of students hope to participate in basketball through learning basketball lessons. 12.9% of the students said they were not looking forward to playing basketball, but the number would

Table 1: Comparison of basketball teaching content between colleges and middle schools.

Content school	Middle school basketball syllabus	College basketball syllabus
Dribble	(1) Straight and curve dribbling (2) In situ cross-step breakthrough (3) In situ ipsilateral breakthrough	(1) Straight and curve dribbling (2) High and low dribbling (3) Swerving dribble
Passing and catching	(1) Two-handed chest passing (2) Two-handed overhead passing (3) One-handed shoulder passing (4) One-handed rebound passing	(1) Two-handed chest passing (2) Two-handed overhead passing and catching (3) One-handed shoulder passing (4) One- and two-handed rebound passing and catching
Footwork	(1) Turn: front turn, back turn (2) Emergency stop: jump emergency stop, step emergency stop (3) Slide step: side slide step, back and forth slide	(1) Running: varied direction running, sideways running, backward running, varied pace running (2) Jump: jump on both feet or on one foot (3) Emergency stop: step, jump stop (4) Turn: front turn, back turn (5) Slide step: side slide step
Shooting	(1) One-handed shoulder shot (2) Layups on the move (3) Jump shot	(1) One-handed shoulder shot in situ (2) Two-handed chest shot in situ (3) One-handed running underhand shot
Tactics	(1) Defensive tactics: man-to-man defense	(1) Introduction to fast break (attack and defense): two on one, three on two (2) Introduction to joint defense (attack and defense): two-on-two formation (3) Introduction to tactics: man to man in half-court
Special physical quality	No	(1) Speed: 30–50 m acceleration (2) Strength: sit-ups, push-ups, supine leg lifts, etc. (3) Endurance: middle-distance race of various distances (4) Flexibility and coordination exercises
Examine	(1) Minute jump shot (2) Three-step layup (3) Two-handed chest passing	(1) A straight and curve dribbling followed by a three-step layup (2) Shot
Credit hour	30	34
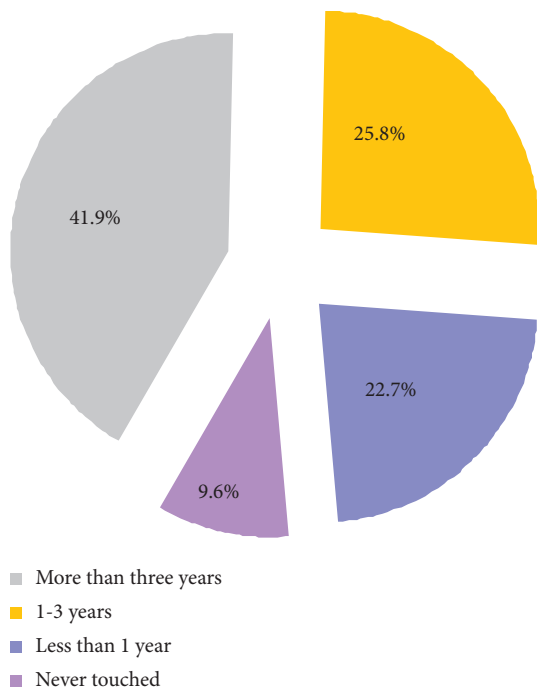
Figure 2: Statistics of students' contact time with basketball.
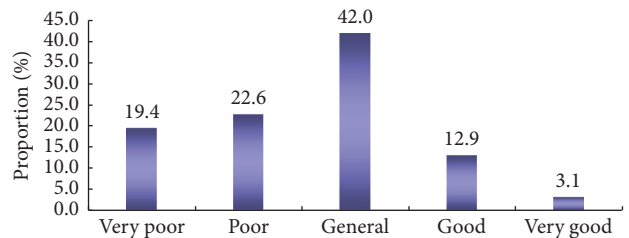
Figure 3: Self-assessment of basic basketball level.

continue to shrink if they were taught properly. Only 5.3% never looked forward to playing basketball.

Nearly 42% of the students think their basketball level is poor or very poor, but 67.7% of the students have more than one year of basketball contact time. 68.8% of the students have only once or never participated in basketball exercise after class, but 81.8% of the students hope to learn basketball to participate in basketball. According to the above questionnaire survey data, if we still use the traditional teaching methods and only pay attention to students' personal skills, it is not conducive to the cultivation of students' sports habits, but also completely contrary to the curriculum goal of cultivating students' lifelong health. Therefore, college basketball education should change the teaching concept
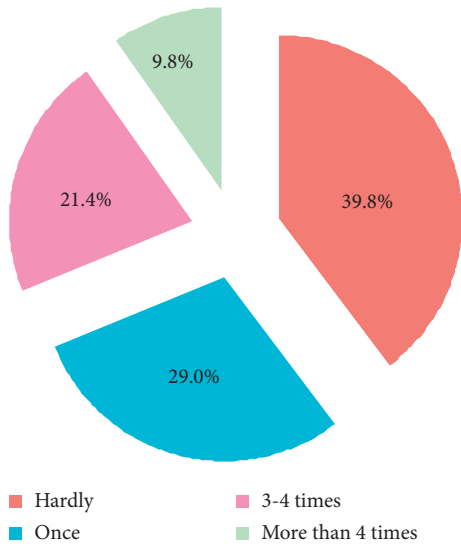
Figure 4: Statistics of times students participate in basketball every week.

- ■ Hardly
- ■ Once
- ■ 3-4 times
- ■ More than 4 times

- ■ Love basketball and hope to learn and improve
- ■ Social communication
- ■ No other items are available
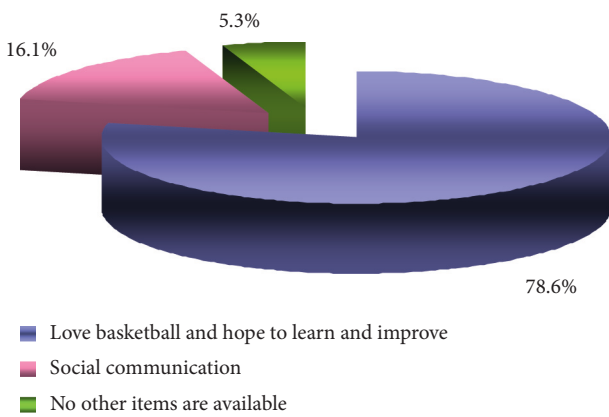
Figure 5: Statistical results of course selection motivation.

- ■ Never expect
- ■ Not very expected
- ■ Looking forward to
- ■ Very much look forward to
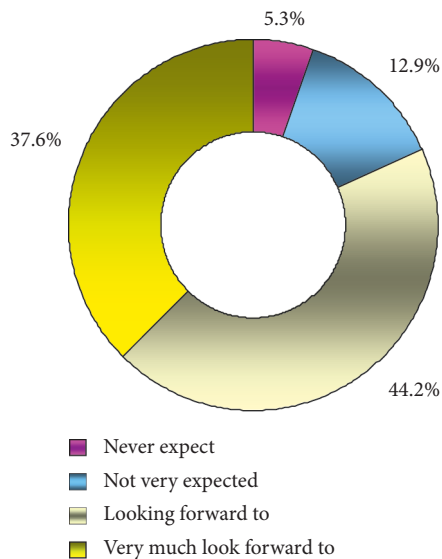
Figure 6: Statistics of expectations for participating in basketball through learning basketball lessons.

and teaching means. It should be student-centered and allow students to learn from each other through teamwork. In this way, students can truly understand the environment in which basketball technology is applied, and their learning enthusiasm can be stimulated, so that students' concept of lifelong physical health can be cultivated.

According to the statistical results of the questionnaire survey of basketball elective courses, although most students have a strong interest in basketball courses, affected by traditional teaching methods, students are not satisfied with the teaching of basketball courses in China on the whole.

3.2.3. Class Hour Design. The outline of "Healthy China 2030" issued in 2016 points out that it is necessary to cultivate young people's sports hobbies and basically realize that young people can master the skills of at least one sport [5]. When sports became physical education, its cultural attributes, participation obligations, content characteristics, training cycle, time and place, collective exercise, and scale of learning all changed greatly. What should have been a "long continuous specialized training process" became "a short and fragmented teaching process in physical education classroom." This is the internal reason why "students have studied physical education for 12 years without learning anything" [14, 15]. According to the survey results in Table 1 and on-site observation, it is found that at least 50% of the students in the basketball option class have average sports skills, and nearly 40% of them have poor basketball skills. We have carried out 12 years, nearly 1260 class hours of school physical education, but most students fail to master the skills of one sport. One of the most important reasons is the unreasonable arrangement of school hours. Taking basketball teaching as an example, the whole middle school basketball teaching time is 30 class hours, and the college basketball teaching time is 34 class hours, including body test time and assessment time. This kind of unclear "comprehensive and diverse" teaching arrangement is the main reason for the ineffectiveness of the current PE curriculum. Cultivating a sport skill should be a continuous teaching process for many years. Therefore, we should appropriately adjust the current course selection methods, extend the class hours of each course, and allow students relatively enough time to deepen and improve the skill in the classroom.

3.2.4. Teaching Methods. From the survey results of students' understanding of basketball course, there may also be some other factors that lead to the unsatisfactory opening of basketball elective course. For example, the modern teaching method of basketball course may be quite different from the traditional teaching mode, which makes it difficult for some students to adapt. Basketball skill is the basis of basketball. It has fixed content, but it is not limited to form. The traditional basketball course is mainly taught in the form of lectures. That is, the teacher demonstrates first, then the students carry on the imitation practice through observation, and the teacher carries on the tour guidance again. The teaching process is boring, and students' initiative in learning is not high. When learning technical movements,

students only know how to do them but do not know why. Thus, when learning movement skills, they do not have a high efficiency. Although lecturing teaching can play a good effect in the early stage of students' basketball sports skill learning, it is not conducive to the in-depth understanding of basketball techniques. The traditional teaching method ignores the subjectivity of students, and the innovative teaching methods such as independent exploration, heuristics, and discussion are not used in basketball teaching. To improve students' basketball skills, we can improve the teaching methods.

4. Necessity of College Basketball Curriculum Mode Reform

4.1. Curriculum Mode Reform Should Conform to the Needs of the Times of National Fitness. Since the 18th National Congress of the Communist Party of China, the CPC Central Committee with Comrade Xi Jinping at its core attaches great importance to physical education and school physical education, emphasizes the close relationship between building a strong country through sports and the Chinese Dream, regards the construction of a healthy China as an important support for the Chinese Dream, integrates physical education and school physical education into the overall plan of realizing the "Two Centenary Goals," and makes the nationwide fitness program a national strategy. Curriculum is the basis of education and teaching in colleges and universities, and curriculum construction is one of the important contents of school teaching reform [16]. Therefore, strengthening physical education curriculum construction is an important guarantee to effectively implement physical education teaching plan and improve teaching level and talent cultivation quality. College basketball curriculum reform should scientifically analyze and rationally understand the new situation and new challenge of the national fitness cause, and fully understand the new orientation, new direction, and new requirements of the college basketball curriculum from the strategic height and overall point of view; understand the strategic positioning of college basketball courses from the perspective of realizing the "Two Centenary Goals" and the Chinese Dream of the great rejuvenation of the Chinese nation; and promote the deepening of education and teaching reform from the height of building a healthy China and a strong country in sports.

4.2. Under the Background of Supply-Side Reform, Curriculum Construction Must Focus on Students' Development. On November 10, 2015, Chinese President Xi Jinping put forward the "supply-side reform" for the first time at the meeting of the Central Leading Group for Financial and Economic Affairs, pointing out that "while moderately expanding aggregate demand, we should strengthen the supply-side structural reform and improve the quality and efficiency of the supply system" [12]. On January 8, 2018, Chen Baosheng, Minister of Education, pointed out in People's Daily that the focus of strengthening school physical education work is to do a good job in teaching material construction and teaching reform in universities and primary and secondary schools [17]. These facts show the inevitability of the supply-side reform of school physical education. The essence of the supply-side reform of college education is also the fundamental embodiment of "student-centered" education. The construction of college basketball courses must consider students' basketball needs and preferences, focus on students' development, improve teaching materials and enrich teaching methods, and provide high-quality college basketball courses.

4.3. Both Scientific Research and Teaching Should Be Emphasized, and the Mutual Transformation between Scientific Research and Teaching Should Be Paid Attention to. As the saying goes, "As a teacher, it's important to preach and get rid of doubts." College teachers should not only undertake the responsibility of "preach" but also cultivate students' independent personality and make them master certain ability to deal with problems by themselves [18]. This requires physical education teachers to timely track the cutting-edge information of the development of physical education, master the new methods and technologies to discover and cultivate students' physical functions, bring the ideas, methods, and progress of physical research into the field of physical education, constantly enrich the connotation of college basketball teaching, realize the feedback of scientific research on teaching, and provide a steady stream of power for college physical education. Physical education teachers in colleges and universities should not only teach students sports skills but also teach students how to exercise scientifically. This requires teachers not only to learn new knowledge but also to adhere to research and pay attention to the mutual promotion of scientific research and teaching.

4.4. It Is an Inevitable Trend of Discipline Construction and Development to Create Excellent Courses. In the future, the subject courses in colleges and universities must have the characteristics of first-class teachers, first-class teaching content, first-class teaching materials, first-class teaching methods, and first-class teaching management; otherwise, they will be submerged by the flood of rapidly developing knowledge [19]. The development of the Internet makes the way for students to acquire knowledge diversified, and basketball classroom is greatly challenged. The goal of basketball discipline construction is always "excellent." It should not only teach students sports knowledge but also be "new," that is, new teaching methods, new learning methods, and new practice methods. With the spring breeze of teaching reform and development in our school, we should develop students' physique and cultivate students' lifelong view of physical education and health.

4.5. The Essence of Physical Education Is to Cultivate Students' Lifelong View of Physical Health. Einstein said that the so-called education is the ability left after forgetting all the knowledge learned in school. This requires teachers not to "read" knowledge to students, but give a spiritual

encouragement or inspiration that can touch or shock their hearts. What basketball class should bring to students will never be forgotten in a lifetime. Inspired by this concept, college basketball teaching should not focus on the teaching of students' basketball skills, but should encourage students to use these skills more and guide students to enjoy basketball [20]. The fundamental purpose of basketball teaching is to let students find fun and gain a sense of achievement in basketball and gradually make basketball a habit of students and accompany them for their whole life.

5. Methods and Measures of College Basketball Curriculum Mode Reform

5.1. Changing Teaching Objectives and Returning Physical Education to Its Origin. Sports skill teaching is the core content of sports teaching, and the sports curriculum system based on sports skills reflects the value of sports as an important course in school education [21]. Similarly, the learning of basketball skills is the core content of basketball teaching. However, the learning of any sports skills is ultimately for application. Basketball game is the most direct way to test basketball sports skills. The basketball game without the support of sports skills is terrible, while the learning of basketball skills without the game is boring and cannot be tested. At present, college physical education still adopts the traditional syllabus, refines the classification of physical skills, and pays attention to form and ignore results, which is contrary to the purpose of basketball sports. Therefore, *t* it is necessary to change the teaching objectives for cultivating students' basketball consciousness. We should start with cultivating students' interest in sports and the practicability of basketball skills, allow the "diversification and personalization" of basketball sports skills, and let basketball education return to the origin of physical fitness.

Around the teaching objectives of physical education courses, combined with the teaching guiding ideology of basketball special courses, the goal system of basketball special courses can be established. As shown in Figure 7, starting from the basic teaching objectives of basketball course, corresponding teaching contents are formulated for the learning objectives of different semesters and stages, to decompose the teaching objectives of basketball course layer by layer and better implement them.

5.2. Optimizing Teaching Content and Reducing Low-End Repetitive Content. Although we have experienced more than ten years of school physical education from primary school to university and have a complete teaching management system, there are many low-end repetitions between college basketball teaching content and middle school basketball teaching content, which wastes a lot of valuable class hours and hinders the development of students' basketball skills. Therefore, the teaching content of college basketball course should reduce the time occupied by the basic sports skills of basketball and use the saved class hours to increase the content of teaching competition, to improve the application ability of students' basketball technology.

Whether basketball skills are mastered or not and whether they are good or bad must be tested in actual combat. At the same time, the fundamental purpose of learning basketball skills is sports leisure and strengthening physique. In the investigation of the factors affecting students' participation in basketball, 35.5% of the students gave up sports because of their poor basketball foundation. It can be said that many people refuse sports because they are not confident or timid, so we should provide as much teaching and competition time as possible in class. The students with little difference in skills will be divided into groups for competition, so that the students can experience the fun of teamwork and the sense of success, which will slowly guide the students to love basketball.

To train students to master various skills of basketball from the aspect of practical ability, we can combine the teaching theory of basketball course with the teaching mode of basketball training, to cultivate applied talents who love basketball. As shown in Figure 8, in the process of basketball practice teaching, students' practical application ability can be cultivated from the aspects of layered practice teaching, club practice teaching, observation training on-site teaching, basketball skill practice teaching, extracurricular training practice, bilingual practice teaching, etc.

5.3. Extending the Class Hours and Changing the Semester System to the Academic Year System. At present, most colleges and universities provide a variety of physical education courses for students, but students are required to complete the study of four sports within two academic years. The original intention of this policy is to "cast a wide net and catch more fish," so that students can find the sports they are interested in and then take it as the first choice of lifelong sports. However, it ignores the students' acceptance ability. Mastering a sports skill requires long-term exercise under the guidance of teachers. It is not easy to master this motor skill in just a short period of more than 30 class hours. This contradicts the strategic requirements of "Healthy China 2030." If we want students to master a sport, we must create opportunities for students to learn a sports skill for a long time. Therefore, it is suggested to cancel the requirement that four different courses must be selected in four semesters and to extend the class hours by changing one choice in one semester to one choice in one academic year. To take care of students' sport needs, students can be allowed to transfer out at the end of each semester according to their own needs. Adopting flexible and diverse course selection methods is not only conducive to students' finding suitable sports but also conducive to students' mastering sports skills, to lay the foundation for students' lifelong sports.

5.4. Being Student-Centered and Innovating Teaching Methods and Means. Basketball is an antagonistic sport in the field. The situation on the field changes rapidly. Only when students really understand the characteristics of various sports skills and flexibly use basketball skills according to the situation on the field, they can achieve better results and obtain a sense of sports achievement. In the early stage of
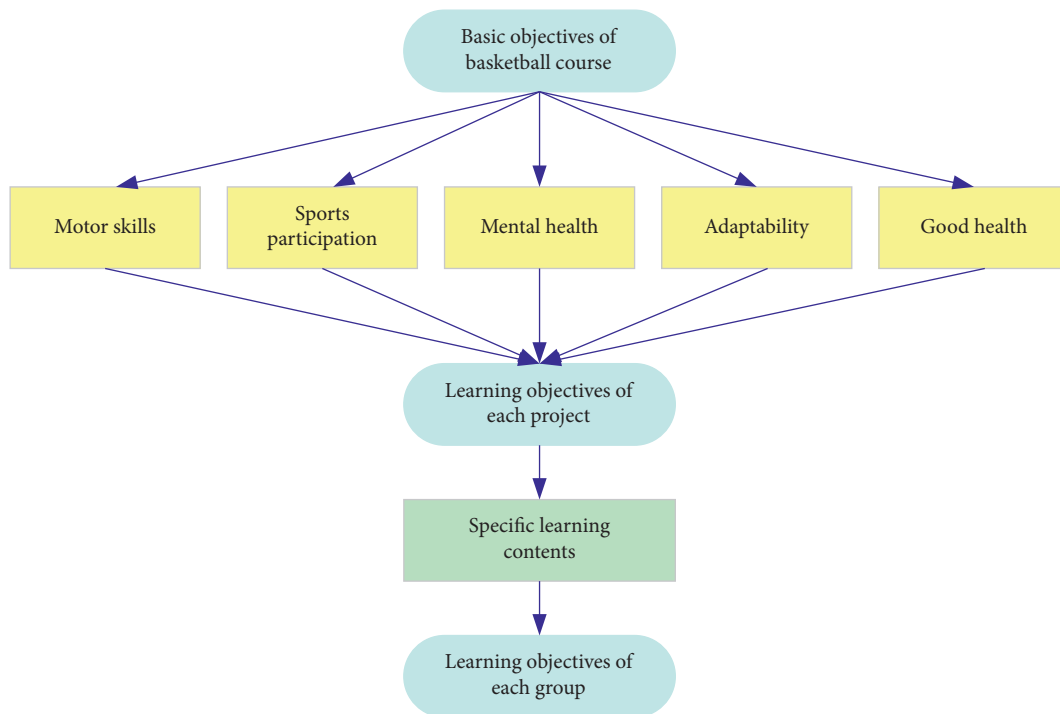
FIGURE 7: Schematic diagram of teaching goal design system of basketball course.
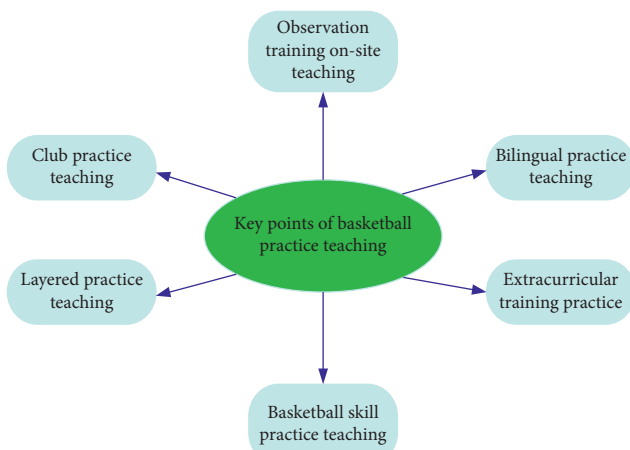
FIGURE 8: Schematic diagram of key points of basketball practical teaching.

sports skill learning, traditional lecturing method of teaching can enable students to quickly establish sports image and improve teaching efficiency, but it shows its limitations in further study of basketball sports skills. Inquiry and heuristic teaching should be properly introduced. This teaching method with students as the main body and teachers as the guide can enable students to gradually master the essentials of motor skills in the process of thinking-practice-re-thinking-practice and fully mobilize students' enthusiasm in learning. The whole teaching process is easy and efficient, which is twice the result with half the effort compared with traditional teaching.

For example, in the training of basketball students' practical ability, diversified teaching methods can be adopted to combine teaching, training, observation, application, and other teaching methods. At the same time, we can adopt the means of combining inside and outside school, inside and outside class, application, and practice to cultivate students' ability, as shown in Figure 9.

In the teaching process of college basketball course, affected by the individual differences in students, if a single teaching method is adopted, it may be difficult to meet the needs of all students. Therefore, layered teaching can be adopted to meet the learning needs of students at different levels.

5.5. Improving the Basketball Course Evaluation System. The assessment standard is like an invisible baton, which is often the place where students spend much time practicing. Therefore, whether the assessment standard is formulated scientifically is directly related to the development of students' sports level. On the whole, there are two deficiencies in school basketball assessment methods: (1) emphasizing form and neglecting result. For example, in the three-step layup assessment, the technical score accounted for 90 points and the hit rate accounted for only 10 points. The purpose of all technical actions on the field is to serve the score. Even if the technique is good, your efforts will be in vain if you do not score in the final shot. It can be said that the hit rate is an important index to test students' psychology and physiology. Therefore, it is suggested to increase the score proportion of hit rate and reduce the score proportion of technical action. (2) The assessment content is not perfect. From primary school to university, the content of basketball assessment has hardly changed. In particular, the setting of fixed-point shooting makes students with poor basketball skills spend a
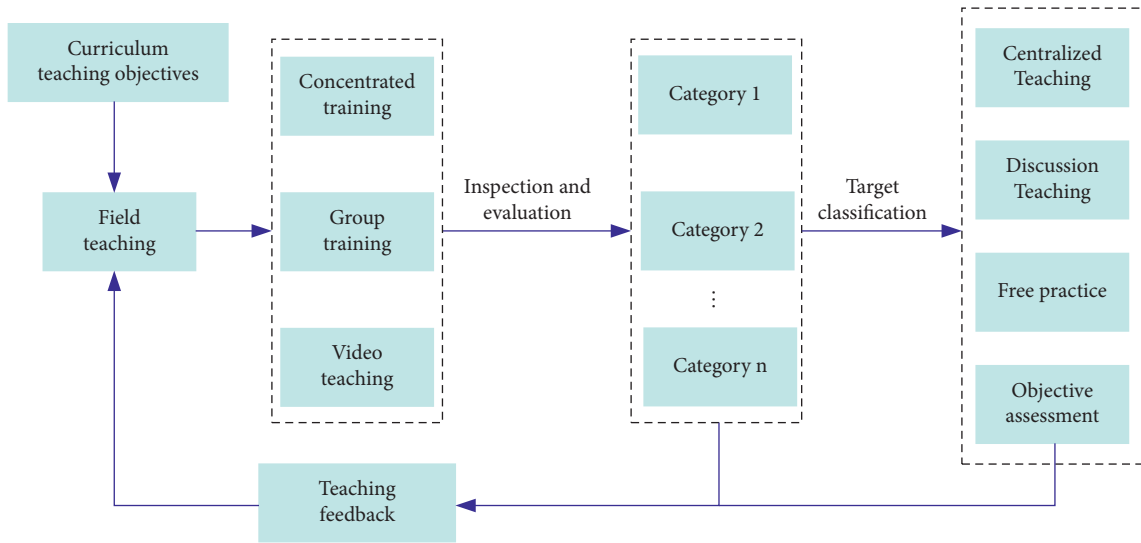
Figure 9: Decomposition diagram of basketball practice teaching method.
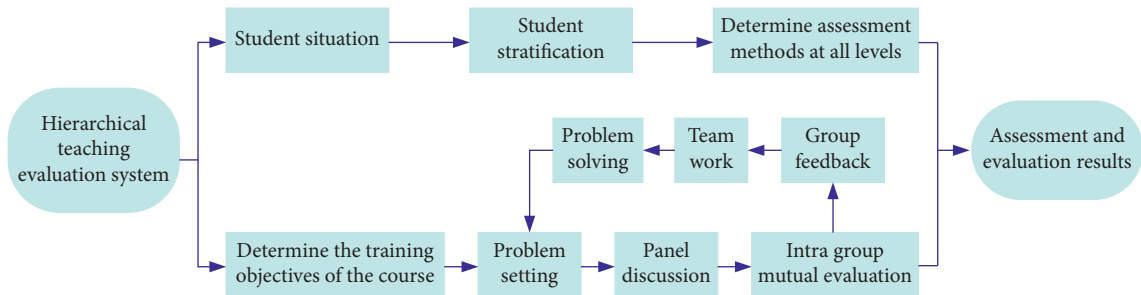
Figure 10: Decomposition diagram of hierarchical teaching evaluation system.

lot of time practicing shooting in each class, which is very unfavorable for improving basketball skills. Basketball is a combination of dribbling and shooting, and the key to improve sports skills is movement. In the actual game, the opponent will not give you time to stand in place and shoot. Therefore, it is suggested to reduce the proportion of technical evaluation scores, increase process evaluation scores, and cooperate with the application of case teaching. This can not only mobilize students' enthusiasm for learning but also greatly promote students' mastery of basketball skills.

In the process of basketball practice teaching, on the basis of mastering the basic situation of students, instructors can divide students into different levels to make students study in a more suitable environment [22]. Students at each level can carry out teaching according to different teaching objectives and requirements. Students at different levels help each other, learn from each other and improve together, and then evaluate according to the corresponding standards in the assessment and evaluation, as shown in Figure 10.

6. Implementation Effect and Evaluation of Teaching Mode

To test the feasibility and effectiveness of the basketball course model proposed in this study in teaching application,

the class of basketball optional course in a university is selected as the object for experimental teaching. According to the existing teaching plan and without affecting the class groups, the students were randomly tested, and the classes with no significant difference between the two groups were used as the experimental group and the control group, respectively. Suppose class 1 is the control group and class 2 is the experimental group, with 30 people in each class. The control group used the traditional teaching mode, and the experimental group used the modern basketball teaching mode. Through the teaching experiment, under the condition that the examination method, content, and standard are the same, the theoretical and practical effects of the two classes of students are examined at the same time.

6.1. Comparison of Teaching Effect Test. From the comparison of theoretical examination results, it is found that the two groups of students have a better grasp of the theoretical level. Among them, the average score of the control group was 82.4, while the average score of the experimental group was 85.7. After testing, there was no significant difference between the two groups. From the comparison of physical fitness examination results, it is found that although different teaching modes have a certain impact on physical fitness, there is no significant difference between the two

TABLE 2: Comparison results of teaching implementation effects between the two groups.

Item	Teaching theory test	Physical fitness test	Practical skill test	Application ability test
Control group	82.4	84.8	86.3	83.6
Experimental group	85.7	86.2	93.5	89.4
P	>0.05	>0.05	<0.05	<0.05

TABLE 3: Comparison of students' psychological evaluation results after practical teaching.

Item	Emotional change	Sports motivation	Collective self-esteem
Control group	18.35 ± 2.56	37.58 ± 4.27	83.52 ± 8.16
Experimental group	22.27 ± 2.83	41.35 ± 4.63	89.26 ± 8.47
T	2.164	2.263	3.472
P	<0.05	<0.05	<0.05

groups. However, from the comparison results of the examination results of basketball skills and application ability, the average scores of the students in the experimental group are 93.5 and 89.4, respectively, and their average scores are higher than those in the control group. After testing, there are significant differences between the two groups. It can be seen that the teaching mode of basketball course proposed in this study mainly focuses on the learning of basketball skills, and the teaching content is also optimized, so that students can participate in every link of teaching. Therefore, when students' basketball technical ability is improved to a certain extent, they will soon be recognized by the team. The self-confidence obtained from the team also promotes students' enthusiasm in training, and the teaching effect will soon appear. The teaching effect comparison results of the two groups of students are shown in Table 2.

6.2. Students' Evaluation and Comparison of Basketball Teaching Mode. To obtain the students' evaluation results of the basketball course teaching mode proposed in this study, the experiment uses the form of questionnaire to investigate the impact of the basketball course teaching mode on students' sports and mainly evaluates the performance of students from three aspects: emotional change, sports motivation, and collective self-esteem. Each evaluation index is expressed by mean and standard deviation, and the later data are processed by statistical software. From the final results, the evaluation results of students in the experimental group in learning well-being, learning interest, and collective self-esteem are significantly higher than those in the control group, as shown in Table 3. It can be seen that the basketball curriculum model proposed in this study can stimulate students' internal motivation and fully display students' personality development, to meet students' sports needs and strengthen the cohesion of the team to a certain extent.

According to the questionnaire survey results of each group on the evaluation of basketball course teaching mode, the evaluation of students in the experimental group on teaching organization methods, learning interest, and other indicators is above the good level, as shown in Figure 11. Therefore, students are satisfied with the basketball teaching model proposed in this study.
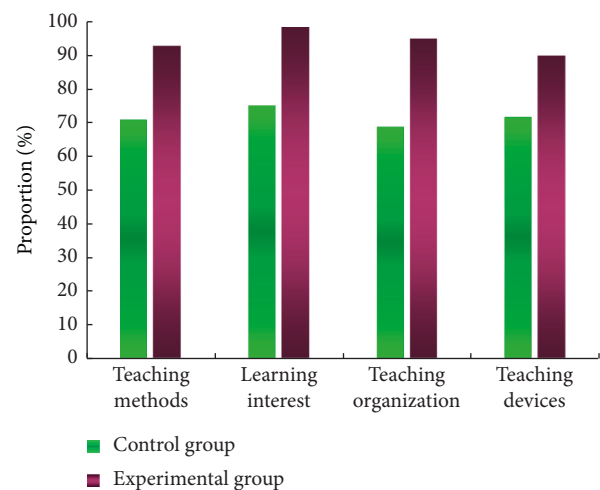
FIGURE 11: Comparison of the proportion of students in the two groups with good teaching evaluation.

7. Conclusion

As a popular sport, basketball is not restricted by age and gender. It can not only enhance physical fitness and promote health but also enrich people's amateur cultural life, being deeply loved by the masses of the people. As the last stop of school education, colleges and universities are important incubators of sports population, and the development of basketball courses affects the development of national fitness plan to a great extent. In view of the problems existing in the teaching of basketball course in colleges and universities, this study puts forward some ways to cultivate students' practical ability by perfecting the goal of basketball special course, improving the teaching mode of basketball course, and comprehensively using a variety of teaching methods. Finally, an example is given to test the application effect of the basketball curriculum model under the background of national fitness. The results show that the basketball curriculum teaching model proposed in this study is better than the traditional model. Under the background that national fitness has been promoted as a national strategy, improving and developing the basketball curriculum mode in colleges and universities are conducive to cultivating students'

lifelong view of sports health, which is of great significance to the realization of "Healthy China 2030."

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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Research Article

The Strategy of How to Deeply Integrate Technology and Finance in the Internet Environment

Yunyan Xu ⓘ

Zhengzhou Shengda University, Zhengzhou 451191, China

Correspondence should be addressed to Yunyan Xu; 100275@shengda.edu.cn

To solve some problems existing in the mechanism of the combination of science and technology and finance, this study studies the deep integration of science and technology and finance combined with the Internet. At present, there are many problems in the development of science and technology finance in terms of bank credit, capital market, service system, and risk supervision. To solve these problems, we need to innovate bank credit products and service modes, expand the breadth and depth of capital market services, establish a new science and technology financial service system, improve science and technology financial supervision regulations and means, and comprehensively promote the deep integration of science and technology and finance in the new era. Based on this, this study first expounds on the importance of the deep integration of science and technology and finance, comprehensively analyzes the problems existing in the deep integration of science and technology and finance, and finally puts forward the construction strategy of science and technology and finance integration platform. In the development of market economy, the deep integration of science and technology and finance and the development of platform model effectively improve the innovation ability of science and technology enterprises. The research shows that the high integration of science and technology and finance is the inevitable trend of the future development of the economic market. Therefore, enterprises need to constantly improve their financial operation ability, pay attention to the ways and means of the development of science and technology finance, strengthen the construction of their own platform, improve their operation ability, and improve their development status, so that enterprises can obtain a higher position in the market competition and achieve the purpose of sustainable development.

1. Introduction

Science and technology and finance are the two core elements of economic development. Scientific and technological innovation is inseparable from the support of modern finance. Modern finance expands business and improves efficiency with the help of technological innovation. The two permeate and promote each other, as shown in Figure 1. The deep integration of science and technology and finance is an important means to realize innovation-driven development. It is particularly necessary for the growth of science and technology enterprises, the transformation and upgrading of economic structure, and the construction of an innovative country. In recent years, with the rapid development of science and technology finance, the allocation of financial resources to the field of science and technology, the penetration of technological innovation into the modern financial industry, and the deepening integration of science and technology finance, there are still many problems in the actual development process, mainly in the following aspects: there are deficiencies in the bank credit model [1]. At present, the capital sources of enterprises are mainly self-raised funds and bank loans, while traditional banks still tend to give priority to provide loan financing services for large enterprises and large projects. The loan evaluation method is mainly to measure the collateral, future cash flow, and loan risk of large enterprises. For high investment and high-risk technology-based small- and medium-sized enterprises, the bank credit supply structure is single, and the innovation of product and service mode lags behind,
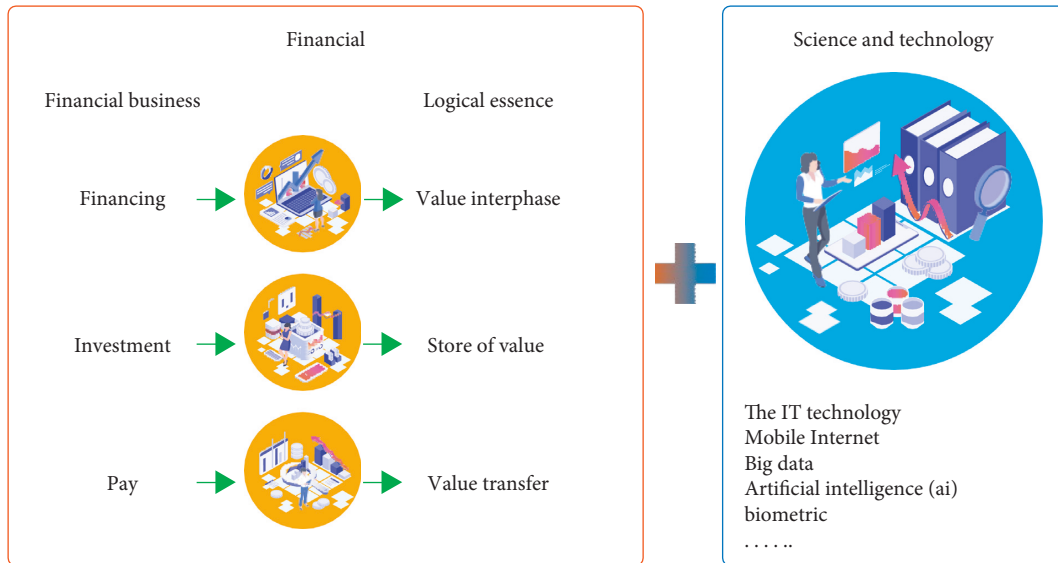
Figure 1: Integration of technology and finance.

resulting in the market that is not active enough to meet the diversified credit demand, and insufficient attention is paid to their intangible assets such as intellectual property rights, which is not conducive to the loans of high-tech enterprises. The development of the capital market system is not perfect. The capital market consists of an on-site market and an off-site market [2]. Among them, the development of the main board market is relatively mature, the capital markets at other levels are relatively backward, the GEM market is still in the primary development stage, the share transfer system of small- and medium-sized enterprises has just started, the development of property right trading market and OTC market is slow, and the development of various capital markets is uneven. Due to the high standard and threshold of main board listing, it is difficult for high-tech small- and medium-sized enterprises to go public and finance. At present, the approval system is implemented for security issuance, which focuses on the business status, profitability, and development prospects of enterprises, and does not pay attention to the R&D ability, intellectual property rights, and other intangible assets of enterprises. It is not applicable to high-tech enterprises with uncertainty and no profit [3]. The scientific and technological financial service system is not perfect. The existing science and technology intermediary services such as science and technology insurance, credit guarantee, credit evaluation and investment, and financing consulting are still in their infancy. The number and scale of service institutions are limited, there is a shortage of professionals, the ability to provide all-round services is weak, the degree of specialization is not high, the knowledge and experience in the professional field are insufficient, and there is a lack of effective guidance. The imperfect scientific and technological information sharing platform and intermediary service system make it difficult to provide professional and personalized financial services for scientific and technological enterprises, which hinders the information coupling of scientific and technological enterprises and financial institutions.

2. Literature Review

Jerene and Sharma said that the support of finance for the development of science and technology industry and the role of science and technology in financial reform are organically combined in social progress and economic development. With the penetration of science and technology into all aspects of economic life, scientific and technological growth will be the foundation and guarantee of future society [4]. Therefore, Jeswari and Krishnan believe that the new category of "science and technology finance" formed by the organic integration of science and technology and finance can more clearly and prominently express the mutual benefit and interaction between science and technology and finance and can more clearly reflect the characteristics of the operation mode of the new economy [5]. Yao et al. believe that finance needs effective innovation to achieve support for scientific and technological development. At the same time, the scientization of finance itself helps to further promote technological innovation and scientific and technological progress, and effective scientific and technological growth will also bring more efficient financial development [6]. Okere and Chen believe that science and technology finance is the deep integration of science and technology and finance, which is not only the focus of China's financial development in the future but also the requirement to improve the scientific and technological level of China's economic development [7]. Zdurak believes that the integration of financial innovation and scientific and technological innovation is the main embodiment of scientific and technological finance. Under the Internet environment, effectively using Internet thinking to promote the deep integration of financial innovation and scientific and technological innovation is a new choice for the rapid solution of the traditional bottleneck of China's scientific and technological finance. In the Internet environment, financial innovation is very beneficial to the deep-seated solution of the organic integration of science, technology, and finance [8]. Rahardjo et al. said that the organic

integration of science, technology, and finance has been continuously strengthened and enriched in both the financial system reform and the science and technology system reform, mainly experiencing the development from single line to multilevel and from administrative system to marketization [9]. Arneret al. believe that with the support of relevant institutions such as banks, insurance, securities, and trusts, multilevel service systems such as loans, finance, capital market, venture capital, and insurance have been preliminarily established [10]. However, Velu and Narmada believe that the current credit investigation system is relatively lacking. In terms of science and technology financing, the lack of credit environment and information is still the main problem [11]. Kireyeva et al. said that at present, the high-tech zones and science parks in many cities have built relevant service platforms such as science and technology financial service groups, science and technology financial service centers, and science and technology venture capital groups [12]. Moreover, the credit service system of small- and medium-sized enterprises has also begun to be built. However, Afroz et al. said that there is still a lack of deep-seated integration, and there is still a lot of room for the function of the financial market [13].

3. Method

3.1. Demand Model of R&D Subject. Why and when will R&D subjects carry out R&D activities? Obviously, it can also be studied from the perspective of its needs. Both individual needs and organizational needs have two aspects. One is the need for survival, that is, the basic need to maintain survival (including individuals in the organization and the organization itself). This requires that the R&D subject must have a certain income or rate of return. When the income or rate of return is lower than the social average, the organization is faced with being eliminated, and the individual means a lower living standard and an unbalanced mentality. Therefore, this is an instinctive need and unconditional. The main way to meet it is to obtain more income [14]. Therefore, from the perspective of the capital scale of R&D investment, it should not only make up for the cost of R&D investment but also make the R&D subject have benefits beyond the cost. Another demand of R&D subject is spiritual demand. For organizations, obtaining honor and status is extremely beneficial to the improvement of the external environment of the organization, which will bring some hidden benefits or hidden cost reduction. For individuals, it also includes the psychological satisfaction brought by the respect of others [15].

Assumption: V is the average social (or industrial) income

R is the current income of R&D individuals

R is the expected rate of return of individual R&D investment

P is the probability that the individual income of R&D decreases and is lower than the average income of society (or industry) $(0 < p < 1)$

Let $X = PR/V$; $X' = PR/V + r$

Then, when $X < 1$, it means that the R&D subject has low income or certain risk, and the R&D subject has the enthusiasm to change the low income through R&D. The smaller the X, the greater the enthusiasm. On the contrary, when $X \geq 1$, the greater the x, the less the enthusiasm. However, if the total income of the R&D subject after R&D cannot make $X' \geq 1$, it indicates that the total scale of R&D investment is not enough, the enthusiasm of the R&D subject will be greatly damaged, and the possibility of moral hazard will be amplified. P reflects the risk level of realizing the average social income, or the intensity of market competition [16]. Therefore, this study constructs the demand model of R&D subject, which can be written as follows:

$$f(X') = 1/X' + X' (X' > 0). \tag{1}$$

Interpretation of the model is as follows:

(1) The first part of the model represents the survival needs of R&D subjects and shows that the survival needs weaken with the growth of R&D subjects' income and the weakening of competition intensity. When X' approaches 0, survival demand $1/X'$ approaches ∞, while spiritual demand X' approaches 0. It shows that due to the low income of R&D subjects, they have a strong desire to increase income. At this time, money and material stimulation are the most sensitive and effective. Honor, status, and respect cannot solve the problem of survival and have little effect on spiritual motivation.

(2) The latter half of the model represents the spiritual demand and shows that the spiritual demand does not exist independently, which increases with the growth of the income of the R&D subject. When X' approaches ∞, survival needs approach 0, while spiritual needs X' approach ∞. It shows that the focus of R&D individuals turns to spiritual satisfaction such as honor, status, and social respect. In this case, they are not sensitive to money and material stimuli [17]. The incentive effect is not good; the desire to enjoy the spirit of status, honor, and social respect is strong, the stimulus response is sensitive, and the incentive effect is remarkable.

(3) When $X' = 1$ and $1/X' = X'$, survival needs and spiritual needs are equal, and the value of demand function in this area is the smallest, indicating that the material incentive and spiritual incentive of R&D subjects in this area are effective. $X' < 1$ focused on survival needs, and $X' > 1$ focused on spiritual needs.

(4) The demand function is always positive, and $f(X') = 1/X' + X' \geq 2$ indicates that the demand of the R&D subject always exists, and the incentive is always necessary and effective.

Since economic value added (EVA) was proposed in the 1980s, it has gradually been widely used since the mid-1990s. It has become an important supplement to the traditional performance measurement index system.

EVA of the enterprise = net operating profit after tax - total capital cost EVA of the enterprise R&D entity can be calculated with the following equation:

$$\text{EVA}_{ij} = S_{ij} - C_{ij} - K_{ij}, \tag{2}$$

where S is the R&D revenue, C is the R&D cost, and K is the capital cost; the subscript i represents a certain R&D project, and j represents a certain year.

Since the R&D funds mainly come from self-owned funds, it is relatively simple to estimate the capital cost. The key is how to estimate R&D revenue and R&D cost.

3.1.1. Estimation of R&D Revenue. From the calculation method of EVA, EVA is historical rather than forward-looking, which is suitable for post-evaluation, and the R&D income is in line with this characteristic. The value of R&D achievements is not reflected in the current period, but in the future market application [18]. Therefore, in the current period of successful R&D, EVA is not calculated, but the R&D income and EVA are calculated in the first year when the R&D results are transformed into market goods. Generally, a certain proportion of sales can be used as the R&D income of each period, as shown in the following equation:

$$S_{ij} = P_{ij} \times R_i, \tag{3}$$

S_{ij} is the R&D income of a scientific and technological achievement in J years, P_{ij} is the sales income of a scientific and technological achievement product in J years, and R_i is the share of R&D income in the sales income. It can be apportioned according to the proportion of R&D cost investment in the total investment cost.

3.1.2. R&D Cost Estimation. The investment of enterprises in R&D is a long-term investment. The R&D process is actually the process of transforming tangible capital such as R&D resources into intangible capital such as new technology and knowledge. Therefore, in the calculation of R&D cost, it should be considered to allocate R&D investment year by year in the future. The starting time and years of allocation should vary according to the type of R&D project. Generally speaking, the starting time should be considered when the product market is relatively stable and the quality risk is small. In addition, the sharing starting time and sharing period of product innovation with large investment scale, great difficulty, and long time are long [19].

3.1.3. Consider the Time Value of Money. When calculating the EVA of the R&D entity, since the cost input and income are not at the same time, they are calculated afterwards. Therefore, if the R&D cost or capital cost is calculated, the time value of money should be considered, so compound interest calculation is required.

3.1.4. EVA Bonus Incentive. The EVA of R&D subject is the contribution of R&D subject to enterprise value, which should be distributed between enterprise and R&D subject.

Bonus A for R&D subject can be calculated according to the following formula:

$$A_{ij} = \text{EVA}_{ij} \times L_j. \tag{4}$$

Among them, L_j is the proportion of R&D entities sharing EVA in J years, which can decrease year by year. According to the incentive theory, the incentive effect of short-term income is more significant than that of long-term income. Therefore, this measure will help to improve the incentive effect for scientific and technological personnel and help to balance the impact of increasing sales on bonuses with product growth. In addition, when $\text{EVA}_{ij} - \text{EVA}_{i,j-1}$ is negative, it means that EVA decreases and the contribution of products to enterprise value decreases. New innovation should be considered. At this time, $L_j = 0$, and the R&D subject will no longer enjoy EVA bonus.

There are many factors affecting whether the R&D subject makes independent R&D investment, but ultimately depends on the value of the project, which is affected by the technical span of the project [20]. The traditional net present value method (NPV) can be used to construct the R&D investment decision model. An important assumption of NPV method is that the cash flow of a project occurs within a predictable range and is then discounted to its present value. Investment decisions must be made now, either immediately or forever.

Obviously, there are two possible options:

(1) Expansion or Contraction Options—when T_0's investment is completed, it is found that the project has a very good prospect in T_m, such as strong market demand and broader and favorable utilization of achievements. Obviously, managers will choose the input of $I(T_m)$ and increase the input of $\Delta I(T_m)$. On the contrary, if it is found that the prospect is not good, investors will tighten or cancel $I(T_m)$'s investment.

(2) Abandonment or Postponement of Option—if the project is found to have abandonment value V' in T_m (e.g., selling the early results of the project has more economic value, finding more favorable alternative projects, and the project results have no market or have been developed ahead of other investors), abandoning the project is an effective choice for the manager. It is also possible to wait in phase T_m to receive more information for further decision-making. At this time, the input of phase m is $I(T_m) = 0$.

When there are expansion or contraction options, as shown in the following equations:

$$\text{NPV} = -I(T_0) - \frac{I(T_m)}{(1 + k_d)^m} + \sum_{t=1}^{n} \frac{C_t}{(1 + k_d)^t}, \tag{5}$$

$$\text{MO} = P\left[-\Delta I(T_m) + \sum_{t=m+1}^{n} \frac{\Delta C_t}{(1 + k_d)^{n-m}}\right] \frac{1}{(1 + k_d)^m}. \tag{6}$$

Then, project value $V = \text{NPV} + \text{MO}$.

When there is a waiver or delay option, the project value is shown in the following equation:

$$V = -I(T_0) + \sum_{t=1}^{m} \frac{C_t}{(1 + k_d)^t} + \frac{V'}{(1 + k_d)^m}. \quad (7)$$

Whenever the project value $V \geq 0$, the project is feasible. Obviously, the above methods provide a feasible scheme for science and technology management. It can assess the sustainability of existing science and technology projects, that is, decide to continue the project or abandon or delay it, and use the transferred funds for other projects. When the abandoned value has a higher present value than the remaining future cash flow, it indicates that it is an economically infeasible project [21].

Generally, the choice of technology span is determined in the early stage of R&D investment. Therefore, only one-phase model needs to be studied. The value V of R&D projects can be measured by the following equation:

$$V = -I_0 + \left[\sum_{t=1}^{T} \frac{P_t}{(1 + k_d)^t} \right] \times q, \quad (8)$$

where I_0 is the technology investment and P_t is the risk return of phase t. q is the R&D risk adjustment coefficient, $0 < q < I$, which is a function of the investment level of scientific and technological resources x_1, the technological span x_2, the R&D ability x_3 of the R&D subject, and the incentive management mechanism x_4. Given x_1, x_3, and x_4, the size of q depends on the technological span. The greater the technological span, the smaller the probability of R&D success and the smaller the R&D risk adjustment coefficient; the smaller the technological span, the greater the R&D risk adjustment coefficient. As shown in the following equation:

$$q = f_1(x_2). \quad (9)$$

At the same time, risk return is a function of market input level y_1 and technology span x_2. Given y_1, the greater the technical span, the greater the risk return, as shown in the following equation:

$$p = f_2(x_2). \quad (10)$$

Equation (9) and equation (10) are substituted into equation (8), and through the following equation:

$$\frac{\partial(1/V)}{\partial x_2} = 0. \quad (11)$$

Then, we can find x_2.

3.2. Internet Finance and Technology Finance under the Thinking of Investment Loan Linkage.
From the essence of economics, commercial banks are typical individual enterprises, which operate independently, take responsibility for their own profits and losses, and pursue profit maximization. For individual customers or corporate customers with more assets, it can bring huge profits to commercial banks and make a high contribution to commercial banks. This is also the reason why commercial banks try to choose customers
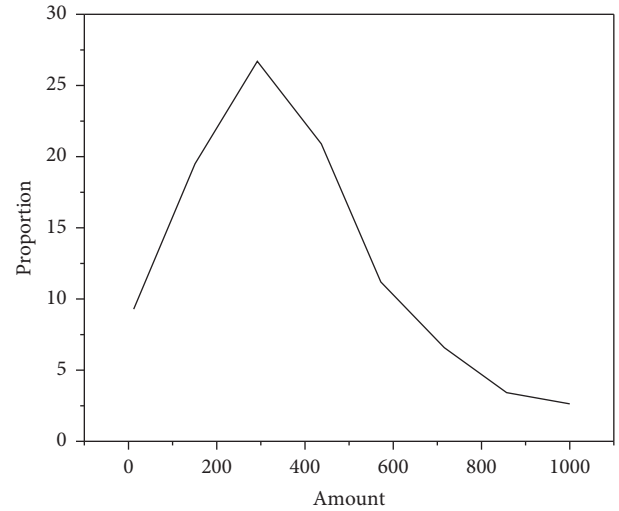
FIGURE 2: Survey results of financing needs of merchants on a platform (%, 10000 yuan).

with large assets and high contribution when selecting customers. However, it also shows that commercial banks have abandoned some small- and medium-sized customers, and there is a large gap in the service of small- and medium-sized customers. When financing, from the perspective of their own development, commercial banks will take more initiative to develop large-scale enterprises with large operation scale and high-risk rating and rely on them to bring sufficient profits [22]. For small- and medium-sized enterprises, their credit rating is relatively low and their scale is small, which can not only bring limited profits to commercial banks but also face a certain risk of default. According to the research results of a platform, as shown in Figure 2, the financing needs of most enterprises are relatively low, concentrated in the range of 210000–500000 yuan; the proportion of enterprise customers with financing needs of less than 500000 yuan reached 55.3%, and the proportion of enterprises with financing needs of less than 2 million yuan reached 87.3%. It can be seen that the current financing demand of enterprises is relatively low, which deviates from the hope of commercial banks to provide large amounts of credit funds, and also creates a good development space and market demand for Internet finance.

The rapid development of information technology, especially the rapid development of Internet technology in recent years, has led to the emergence of new generation technologies such as social networks, search engines, cloud computing, and big data, which provides an effective channel to solve the problem of information asymmetry in the financial market. Through Internet channels and big data technology, the information between fund demanders and suppliers is more matched, the information asymmetry in the market is gradually transparent, and the two sides of fund supply and demand can communicate directly through the Internet platform. In addition, two or more parties can conduct transactions at the same time, making the price determination more transparent. While greatly reducing the information processing cost and transaction cost, it can form

TABLE 1: Comparative analysis of resource allocation between traditional finance and Internet finance.

Comparison item	Traditional finance	Online finance
Information processing	High cost	Low cost
Risk assessment	Information asymmetry	Information symmetry
Capital supply and demand	Bank intermediary	The supplier and the demander shall solve the problem by themselves
Means of payment	Banks act as payment intermediaries	Payment system
Supply and demand sides	Indirect transaction	Direct transaction
Transaction cost	Higher	Internet-based, low cost

a long-term stable relationship between various participants and avoid moral hazard, as shown in Table 1. It can be seen that the fairness and effectiveness of Internet finance have been significantly improved compared with traditional finance.

Internet finance can greatly optimize the ecological environment of social capital and further improve the functional chain of investment and financing finance. According to the data of the central bank, in 2021, the proportion of China's direct financing in the scale of social financing was only 27%. The emerging direct financing channels represented by P2P online loan and equity crowdfunding have huge development space, which can innovate the investment and loan linkage in the field of Internet finance. In addition, Internet finance has seven business forms, such as P2P online loan, crowdfunding, third-party payment, and Internet fund. It has built a thinking mode of investment loan linkage and a complete financial ecosystem and has a relatively complete service closed-loop entrepreneurial service platform. Compared with traditional financial institutions such as commercial banks, Internet finance also has the advantages of fast transformation speed, strong innovation ability, low service cost, and high information transparency [23]. At the same time, Internet finance and technology finance are the most repetitive financial concepts. Internet finance can not only form a closed loop for investment and loan linkage but also integrate with traditional investment and loan institutions to jointly promote the development of technology finance and promote scientific and technological innovation.

(1) P2P Online Loan—Debt Investment. P2P loan is a relatively perfect Internet financial model. It entered China in 2007. At present, it is gradually localized in combination with China's special national conditions. According to the development process of P2P loans in China, P2P loans are currently in the period of industry integration, as shown in Figure 3.

In 2021, there were 6761 P2P loan companies in China, with a year-on-year increase of 138.31%; the transaction volume reached 3702.1 billion yuan, a year-on-year increase of 281.34%, showing an explosive and rapid growth trend as shown in Figure 4. Since 2016, P2P loans have been growing rapidly. The rapid development of information technology has given sufficient support. On the one hand, there is a huge demand for credit, especially for groups marginalized by banks, such as small and micro-
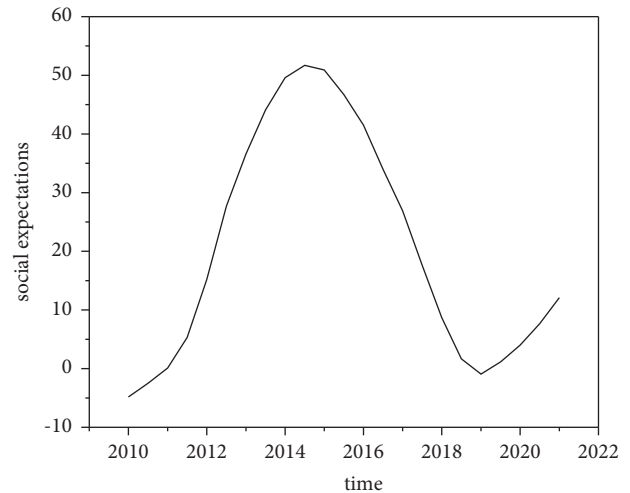
FIGURE 3: Schematic diagram of P2P development process.

enterprises, individual industrial and commercial households, and ordinary individuals.

P2P network lending mode refers to the lending relationship between individuals; that is, the investment and financing parties implement transactions based on P2P platform. Therefore, P2P network lending platform should be an information intermediary, and this investment method belongs to debt investment. As shown in Figure 5, the trading volume of P2P online loan industry is still expanding, so the online loan model can play the role of "debt investment" and play a great role in investment and loan linkage. In practice, the P2P online loan industry does invest a lot of financial resources in technology, new energy, and other enterprises, and more than 90% of the funds serve small and micro-enterprises [24]. At the same time, the P2P online loan industry still maintains a rapid development trend, and the industry scale continues to expand and has growing credit resources, which has laid a good financial foundation for the development of investment loan linkage business.

(2) Equity Crowdfunding—Equity Investment. Equity crowdfunding refers to that a start-up company takes out part of its equity, and investors can obtain shares by taking shares in the company and get corresponding income in the later stage. Equity crowdfunding can play the role of "equity investment" in
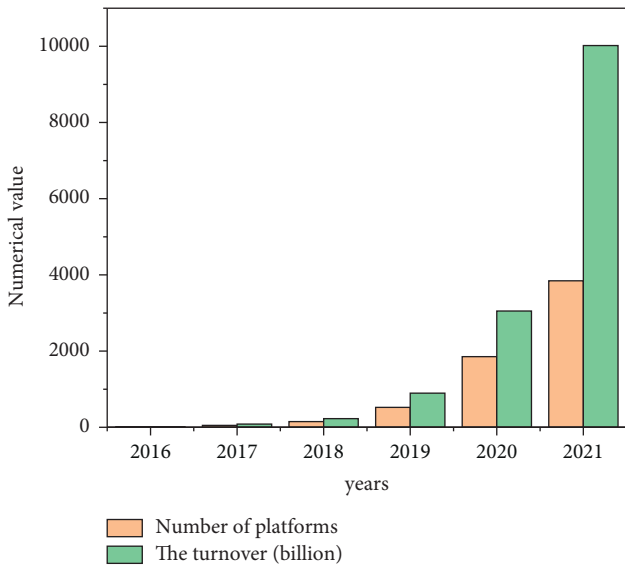
FIGURE 4: Number of P2P lending companies in China from 2016 to 2021.
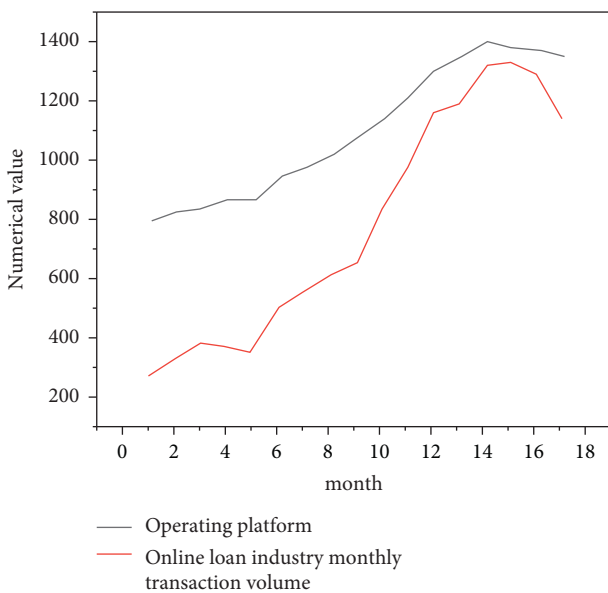
FIGURE 5: Change trend of monthly trading volume and number of operating platforms of P2P online loan industry.

FIGURE 6: Distribution of types of crowdfunding platforms.

the linkage of investment and loan. In 2021, private equity crowdfunding platforms accounted for 41.5%, and their industry scale reached 6.7 billion~7.3 billion, 4~5 times that of the previous year. Moreover, the industry-leading platforms mainly serve scientific and technological small and micro-enterprises (see Figure 6). Once the investment and loan linkage service is opened, the equity crowdfunding platform can further improve the successful financing probability and efficiency of high-quality entrepreneurial projects and improve the service ability of the platform for more high-quality projects. At the same time, taking the investment and loan

linkage business as an opportunity, equity crowdfunding can connect banks and other financial institutions, which helps the equity crowdfunding platform open new cooperation space between multilevel capital markets and increase business cooperation opportunities with multiple parties. In addition, with the help of investment and loan combination, the equity crowdfunding platform can also integrate the project resources, professional knowledge, and investment ability of relevant parties, which is conducive to the risk control management of the platform itself and improve the investment experience of investors.

(3) Complementary Functions of Other Business Formats. In the process of capital flow, the third-party payment can complete the currency payment, capital clearing, query, and statistics between the investment and financing parties and financial institutions by providing capital circulation channels and can carry out real-time tracking analysis and early warning based on the transaction data. Internet trust and Internet fund can raise funds through the platform, invest in specific technology-based small- and medium-sized enterprises in the form of creditor's rights, and absorb government funds, venture capital institutions, social investors, etc., to guarantee the participation of companies and the participation of government credit, improve the credit rating of trust fund, and hand it over to the bank for fund custody. Internet insurance can explore the

"insurance + credit" model, take credit guarantee insurance products as the carrier, give play to the financing and credit enhancement function of credit guarantee insurance, and alleviate the financing difficulties and expensive problems of small- and medium-sized enterprises. In addition, some Internet financial enterprises also have financing platforms, investment and financing advisory services (FA), media, research institutes, and other major business segments. Several business boards are connected with each other, creating a complete business closed loop for the venture capital ecosystem. They can provide products and services for entrepreneurs, investment institutions and individual investors at different stages from project collection, project incubation, project investment and financing services, project dissemination to industry research, and project packaging.

4. Results and Analysis

4.1. Reasons for the Passive Development of Commercial Banks in the Context of Internet Finance. The five major state-owned commercial banks *A*, *B*, *C*, *D,* and *E* have long occupied a monopoly position in the operation of China's banking industry and accounted for a large proportion of the credit amount of all financial institutions. As can be seen from Figure 7, since 2014, the credit amount of China's financial institutions has increased from 157840.5 billion yuan to 251624.1 billion yuan in 2021, with an obvious growth rate; at the same time, the credit volume of the five major state-owned commercial banks also maintained a rapid growth trend, from 61305 billion yuan in 2014 to 97312 billion yuan. Overall, the proportion of the credit volume of the five major state-owned commercial banks has maintained a downward trend, but the overall proportion is still more than 50%, indicating that their monopoly position in the domestic credit market has not changed.

From the specific data, since 2021, the proportion of interest margin income of China's major commercial banks has gradually decreased, as shown in Figure 8. By 2021, the proportion of interest margin income of major commercial banks had basically decreased from 71% to 74%, nearly 17 percentage points lower than that in 2014. Among them, in 2021, the proportion of interest margin income of Bank of China was the lowest, reaching 51.4%, which was at a relatively leading level. It can be seen that the overall development trend is good, but the overall level is still not high, and there is still a large gap from the level of foreign commercial banks.

From the perspective of intermediary business income, the income of China's major commercial banks accounted for a small proportion in 2014. For example, only 7.1% of the income of bank came from intermediary business; the highest is bank C, which only reached 16.7%. After recent development, the proportion of intermediary business income of commercial banks has significantly increased. By 2021, the proportion of intermediary business income of commercial banks is basically close to 25%, and Bank C has
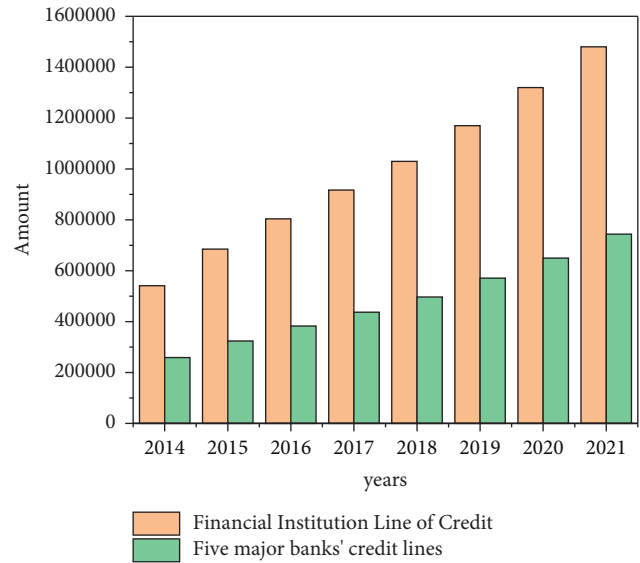
Figure 7: Proportion of loan scale of five major banks in 2014–2021.

reached 30.6%, which is in the leading position of commercial banks, as shown in Figure 9. Compared with commercial banks in other countries, the proportion of intermediate business income of Chinese commercial banks is still relatively low, but it has maintained a good development trend. It is believed that the gap with foreign countries will be further narrowed in the future.

At present, the development level of China's financial market is still relatively low, commercial bank financing is still the main financing channel in China, and the imbalance between direct financing and indirect financing is serious, as shown in Figure 10. In China's financing structure in recent years, indirect financing has always accounted for the largest proportion, and its proportion reached the highest value of 89.4% in 2016, occupying an overwhelming advantage in the whole financing system. After that, although its proportion has declined to a certain extent, the proportion of indirect financing was 82.1% in 2021, and there is still a huge gap between the proportion of direct financing and it, which needs to be further improved.

4.2. Realization Mechanism of Connection between Science and Technology and Capital Market. The remarkable feature of scientific and technological achievements is their strong timeliness. The update speed of scientific and technological products is fast. If the transformation is not timely, or the application scale is too small and narrow, it may be quickly obsolete and replaced by other products or technologies. The alternative products will ruthlessly occupy the market share of the originator, and the value of scientific and technological achievements will be rapidly reduced or even lost. It can be seen that the transformation of scientific and technological achievements is not only a question of whether they can be commercialized but also a question of whether they can quickly occupy the market, realize large-scale application, and maximize their value in a short time. This
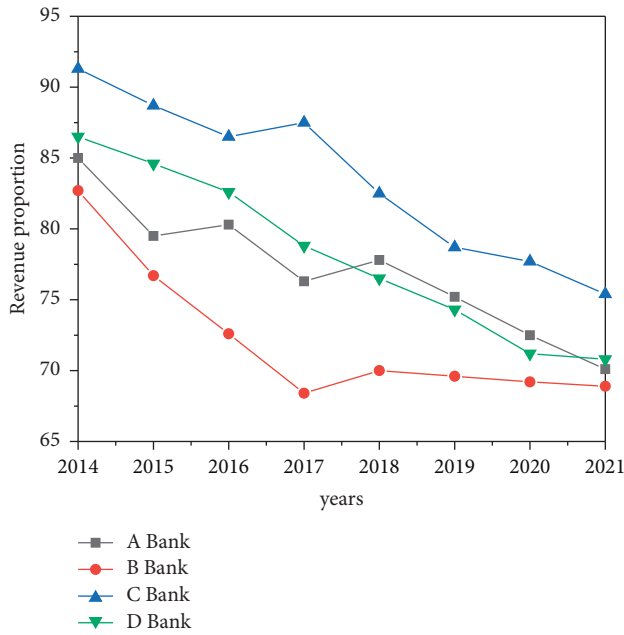
FIGURE 8: Proportion of interest margin income of commercial banks (%).
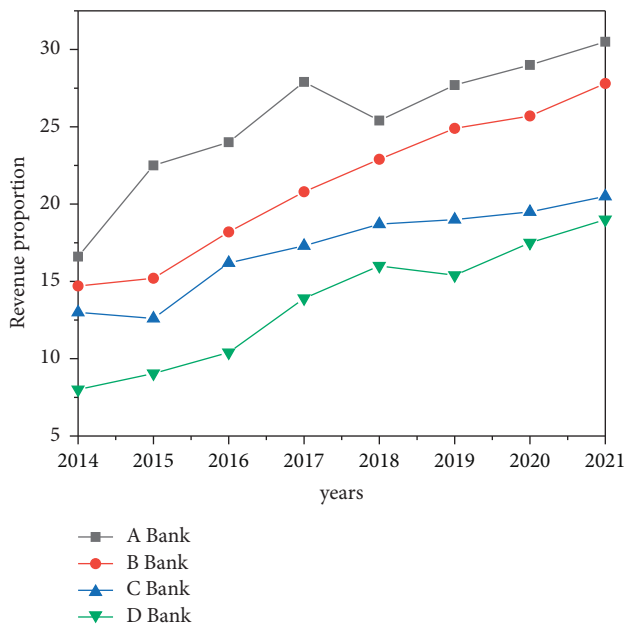
FIGURE 9: Proportion of intermediate business income of commercial banks (%).

FIGURE 10: China's social financing structure from 2014 to 2021 (100 million yuan).

In the early stage of the industrialization of scientific and technological achievements, absorbing venture capital is an important aspect of the industrialization of scientific and technological achievements. In particular, the absorption of organized venture capital can not only bring long-term capital but also bring value-added services such as management experience, financing, and sales channels.

Organized venture capital is invested through venture capital institutions. The process usually includes options, negotiation, contract determination, and post-investment management, as shown in Figure 12. Its investment system design also focuses on these aspects.

As the main body and carrier of scientific and technological innovation activities, science and technology enterprises can use the property right trading market to transfer part of their equity, technology patents (intangible assets), and tangible assets in the property right trading market and can also list and finance science and technology projects or patents, which provides a new financing channel to solve the capital shortage of small- and medium-sized science and technology enterprises and lays a good foundation for further capital market operation. The transfer of equity, patents, and tangible assets operates basically the same in the property rights trading market.

inevitably requires strong capital support, and only the capital market can provide such support. Therefore, the transformation of scientific and technological achievements and the industrialization of scientific and technological achievements must connect with the capital market and must rely on and make use of the capital market. This is the only way for the transformation and industrialization of scientific and technological achievements. The realization process and mechanism of the connection between science and technology and capital market are shown in Figure 11.

4.2.1. Equity Transfer of Science and Technology Enterprises. Under the condition of non-listing, through the transfer of equity in the property right trading market, science and technology enterprises meet the purposes of investment withdrawal, improving equity structure and introducing strategic investors in the transformation of scientific and technological achievements, which is conducive to accelerating the transformation of scientific and technological achievements. The basic operation process is shown in Figure 13.
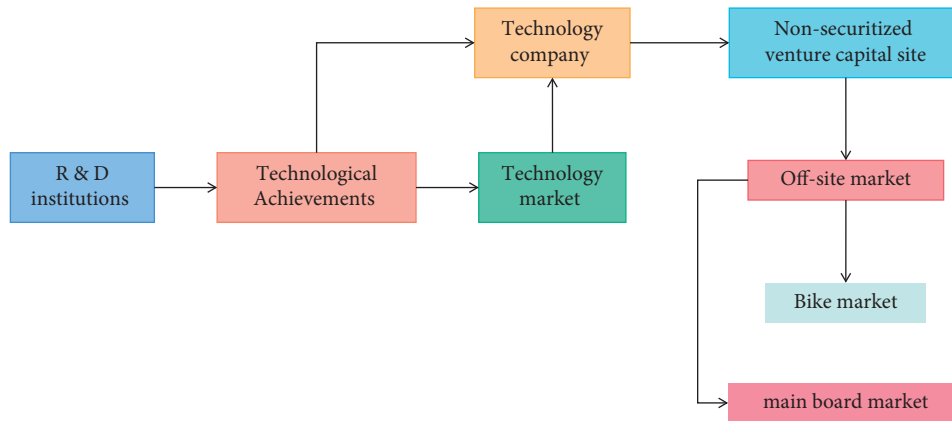
FIGURE 11: Realization mechanism of docking between science and technology and capital market.
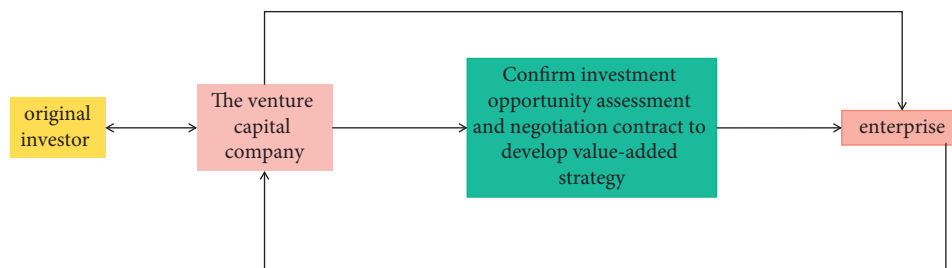
FIGURE 12: Investment mechanism of venture capital institutions.
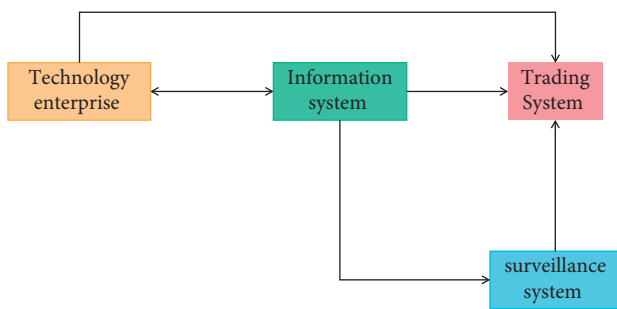
FIGURE 13: Operation mechanism of equity transfer of science and technology enterprises in property right trading market.

The first step is that the technology enterprises should trust the equity of the enterprise in the designated custodian institution, sign an agreement with the property right brokerage institution and entrust it to conduct property right transactions; the second step is to entrust the appraisal institution to evaluate its equity value and clarify the transfer purpose and the number of shares transferred; the third step is to promote in the relevant information system through the qualification examination and screening of the property right exchange; the fourth step is to offer the transfer price, put forward the basic and necessary conditions for the transfer, and list them in the relevant trading system; the fifth step is to preliminarily determine the collection of qualified transferees, and the final transferee is determined by bidding; and the sixth step is to sign a contract, transfer the ownership in the equity custody institution, and settle in a special account.

In this process, there are two problems that have a certain impact on the smooth realization of property right transaction. First, who is the subject of the qualification of the transferee? As a market platform, the main responsibility of the exchange is to maintain fairness and justice. However, it is not conducive to the exercise of the transferor's rights for the exchange to confirm the qualification of the transferee as a single subject, while the transferor as a single subject to confirm the qualification of the transferee may deliberately exclude other transferee intents and hinder fair trading because there are potential transferee before the transferor is listed. Therefore, the relevant mechanisms in this regard need to be studied. The exchange and the transferor jointly determine that negotiation is a way to solve this problem [25]. It also requires that when setting the necessary transfer conditions, there should be reasons based on the purpose of development and legal compliance. The proposed transfer conditions should be necessary and reasonable, and there should be no content with clear direction or against fair competition.

The second is the selection of bidding methods. In theory, online electronic bidding is the most ideal bidding mechanism. It is not limited by region and number of people and can conduct continuous bidding, but it can play the best effect only when there are more participants. As the property right transaction cannot be broken down, there will not be many bidding participants, which is difficult to ensure the full disclosure of the equity value. In fact, the number of bidding participants has become the key to the bidding mechanism. Therefore, market managers should actively publicize to introduce multiple bidders. In addition, whether
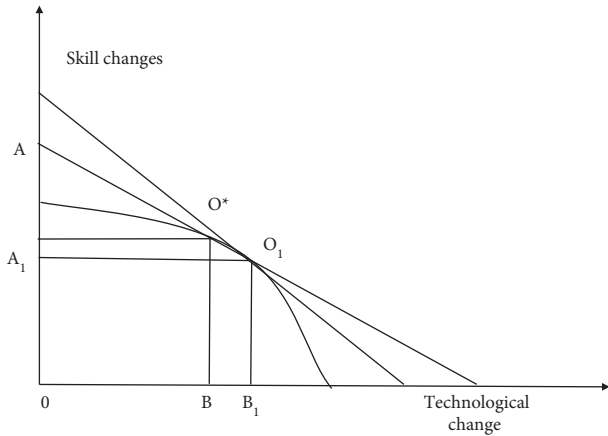
Figure 14: Technological change.

Figure 15: Special technology change.

we can learn from the principle of futures, establish a futures market with property price as the target, and guide the delivery price through the price of futures market is also a problem of research value.

4.3. Demonstration of the Relationship between Science and Technology Finance, Technological Innovation, and Economic Development. At present, the factor market with significant changes and the fierce competition among enterprises with different technologies and absolute or relative factor cost differences from different regions and countries have become the prominent characteristics of global economic operation. Among them, the key force that can cause factor changes and win the competition is technological change. There are two different but transformable dimensions of technological change, namely new general technological change and special technological change. The former can be widely used by factor users in the factor market to improve total factor productivity; the latter has a limited range of applications, but it is a new source of general technology. The introduction and adoption of technological change will bring changes in resource endowment and affect the structure of relative price, so as to realize the adjustment of industrial structure and even economic structure, so as to obtain industrial growth and economic development. Therefore, how to effectively guide the transformation of special technology, improve the transformation efficiency from special technology to general technology, and promote the application of new general technology has become the key link of economic development. As the deep integration of science and technology and finance, science and technology finance can obviously shoulder this important task. The reasons are as follows.

Figure 14 shows two choices faced by enterprises: one is the growth brought by adjustment in the skill space defined by the existing technology, but the conversion cost of skill change needs to be considered; the second is the growth brought by the introduction of new technological changes to reconstruct the skill space, but there will also be greater change costs. Therefore, the boundary of possible change is formed by the effects of investing in skill change and technological change. Figure 15 compares the types of
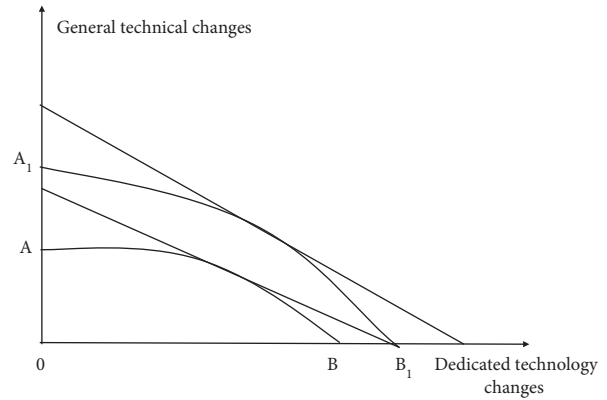
technological change, i.e., special technology and general technology, to illustrate the final benefits of these two types of technological change. Line AO^*B in Figure 14 represents the equal income line without financial support, and the intercept of the vertical axis and horizontal axis represents the level of skill and technological change, respectively. Line $A_1O_1B_1$ represents the change after financial support. The adjustment cost of technological change is reduced through financial support, which benefits from the improvement of capital availability and the expansion of total capital. Therefore, enterprises are more willing to choose technological change that changes the original skill space, which will lead to the expansion of output boundary. In Figure 15, through the credit screening of financial institutions and the rational selection of financial markets, it can not only greatly improve the identification efficiency of which special technology can be more effectively converted into general technology but also improve the promotion efficiency of the introduction and application of general technology, to improve the quantity, variety, and influence of technological innovation [26]. It is realized as the expansion of the output boundary from AB to A_1B_1 and the growth of the overall level of the equal income line.

5. Conclusion

The combination of science and technology and finance refers to the mutual support and interaction between science and technology activities and financial activities. This study mainly studies the support and promotion of the financial system to science and technology. To study the mechanism of the combination of science and technology and finance is to study the structure, relationship, and connection of relevant subjects in the process of the combination of science and technology and finance, as well as the way of interaction, and to study the protective and promoting role of financial instruments, financial institutions and environment in the generation, and transformation of scientific and technological achievements. In modern economy, science and technology and finance have become the most active factors in today's social productive forces. The development of science and technology is inseparable from the support of finance. On the one hand, to win the initiative in the

competition, relying on scientific and technological innovation to improve the country's comprehensive national strength and core competitiveness, establish a national innovation system, and take the road of innovative national development has become the common choice of many countries in the world. On the other hand, the modern financial industry has developed into a deeper and broader field. Financial institutions have provided new support and vitality for the development of science and technology through financial innovation methods such as redesign, improvement, and recombination, which have greatly promoted the development of modern high technology. Commercial banks have both advantages and disadvantages in the process of competing with Internet finance. In terms of advantages, commercial banks have more customer resources, more risk aversion tools, and more stable operation system, and mobile payment products have achieved initial results; in terms of disadvantages, commercial banks have industry monopoly and lack of crisis awareness, which are limited to the negative response of the established profit model, insufficient product innovation and development, unreasonable capital utilization structure, and the constraints and restrictions of the macro-environment. Under the impact of Internet finance, commercial banks should take positive countermeasures, mainly including fully promoting product and service innovation, actively exploring the field of Internet financial business, building a one-stop financial service platform, fully promoting Internet technology innovation, respecting the spirit of the Internet, seeking win-win cooperation, and improving the efficiency of the internal mechanism of commercial banks.

Data Availability

The labeled data set used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

Using Blockchain Technology and Sharing Culture to Promote Sustainable Forest Management in Tribal Communities

Yixiao Peng[1] and Wenyi Huang [ID][2]

[1]*School of Economics, Zhejiang University of Technology, Hangzhou, China*
[2]*Postgraduate Programs in Management, I-Shou University, Kaohsiung, Taiwan*

Correspondence should be addressed to Wenyi Huang; huangwenyi7533967@hotmail.com

Forest protection is crucial to ensuring the balance between human beings and ecology. This study explores the key role played by communities that originally lived in forest-protected areas in implementing the traditional management of forests. The unified management mode previously used by the state power can no longer meet the demands of modern times; hence, multiple types of management systems should be implemented to enable adaption to the original ecology of forest areas. A multimodal management mode should be adopted to restore the original ecology of forest areas. The adoption of this management system can restore a forest to its original state (i.e., the state that existed prior to the entry of state power). The forest has been in a state of ecological balance involving numerous species since ancient times. However, in the modern field of science, the passive restoration of a community's self-governance ability could be unsustainable and unstable. To improve this situation, blockchain technology can first be used to improve the community management of a forest, such that the capabilities of the original local community can be improved; second, tourism promotion benefits both the community and the forest. When a community in a forest develops the tourism industry with the support of blockchain technology, the information and resources of all parties can be widely connected with the larger world, and this considerably increases success rates; finally, the traditional spiritual culture of a community, such as the culture of sharing, should be promoted. In addition to the skillful utilization of technology, culture can improve the traditional forest management ability of tribal communities who live in native forest areas in terms of their personality traits. Overall, we conclude that: against the evolution history of the over one hundred years, the adoption of new technology for forest management is inherently a creative innovation for the tribal community's entrepreneurial development.

1. Introduction

Tribal communities living in the forest have maintained a state of balance with the ecology of the forest since ancient times, just like the other species that live in the forest. This balance was not broken until the interference of an external force, namely the power of the state. The main purpose of state interference is to obtain forest resources. Hence, many management models for obtaining resources have been developed. The acquisition of forest resources started with visible trees, minerals, and medicinal plants, which was followed by the introduction of land loss protection, air environment protection, and climate change stability policies; these are all direct or indirect means of acquiring forest resources.

Among the forest management strategies that were adopted by various countries for tribe communities located in forests, the first was the strategy of providing regional protection to an entire forest. When a management implements this decision, they adopt expulsion-oriented methods to forcibly move tribe communities out of protected areas. The second type of management strategy involves the adoption of a cooperative model in which the tribe community in a protected area is a participant, especially a tribe community that is based in the land around a forest or buffer zone. People who adopt the third type of management strategy believe that having the status of a protected area does not, by itself, ensure the effectiveness of conservation policies. Instead, they assert that people should gradually

adopt multiple forest management strategies, including the integration of people in a community area as management participants [1].

The intrusion of state power in the development of forest resource management strategies and planning has resulted in poor execution results in numerous forest reserves, forcing policymakers and scholars to reconsider the utility of communities in resource utilization and conservation [2]. The main reason for incorporating community participation into strategic forest management is that traditional knowledge is acquired by local people through the accumulation of experience and informal experimentation and the development of a deep understanding of the environment in a specific cultural context. Traditional knowledge can become social knowledge, facilitate communication and decision-making, and serve as a management basis for local institutions [3].

First, although community participation is gradually being incorporated into forest management, comprehensive policy-related assistance has not yet been provided. Consequently, communities often cannot fully restore their long-standing management habits in relation to forests [4]. Second, communities living in forests do not consider the improvements to their quality of life. Hence, they move out of the forest areas that they grew up in because of distress and do not consider the long-term development of their tribal community in the forest [5]. Third, no study has thoroughly discussed the influence of a traditional community culture on forest management [6]. Fourth, modern science and technology have not been applied to study the original forest management abilities of original forest-dwelling communities and assist tribe communities in identifying appropriate and innovative modern technological methods during the process of social transformation, such that the traditional forest management abilities of tribal communities can be effectively preserved [7].

Through the present study, the researchers aim to: (1) discuss the feasibility of a new partnership between the Paiwan tribe community and national policies, (2) utilize blockchain technology to support the re-development of the traditional management ability of the community, and (3) leverage the local culture of sharing such that management rules can be internalized in the personality traits of community residents and concrete suggestions relating to community forest management can be proposed.

2. Literature Review of Forest Protection History

2.1. Evolution of Forestry Management in the Paiwan Tribe Community. After it lost the Sino-Japanese War in 1895, the Qing Dynasty was forced to sign the Treaty of Shimonoseki to confirm its cession of Taiwan and Penghu to Japan. The regimes of the various islands of Taiwan gradually started to enter a state of comprehensive management at the national level. Previously, power at the national level did not have an effective presence in various areas in the islands of Taiwan. Therefore, the indigenous Paiwan tribal community adopted the forest management mode that was handed down to them

from ancient times through living culture. Most indigenous people live in high mountains, and their traditional living areas are divided into forest hunting, farming, and community residential areas. The utilization of forest areas usually involves entering a forest to gather fruits and plants or to hunt in accordance with seasonal or ritual practices; it also involves entering a forest area to obtain the wood materials required for the construction of community houses. These activities, which involve visiting forests, are temporal, regional, and purposeful, and the tribe residents will not dwell or gather resources in a mountain forest for a prolonged period without a specific purpose. The members of the tribal community are warned against straying into certain areas, or they will be punished by divine powers. Therefore, some forests are regarded sacred forests, and the amount of edible fruits that can be picked from these forests is limited. For some areas, specific groups are assigned to manage them and ensure that the tribe community does not lack rain and water sources. The groups with this responsibility protect forest resources and are similar to law enforcement officers [8, 9].

The entrance of Japan into Taiwan marked the intrusion of state power into the Paiwan tribe community. State power forcefully dominated the rules of life and cultures of all tribal communities, and all of the forests in traditional regions were nationalized. The hunting quotas and seasons were stipulated by the Japanese police, the method of farming changed from burning and rotational cultivation to fixed farming, and the ownership of the land by a tribal community was redistributed from the chieftain level to individuals under a private property system. A clear distinction is made between agricultural farming land and forest land. Consequently, the area of farming land was considerably reduced, and hence existing farming lands were used more frequently. The state power then did not regard the crisis of environmental ecological imbalance as a focus of their governance. Instead, they focused on suppressing the rise of rebellions in tribal communities. The Paiwan tribe underwent a community reconfiguration at that time; a relatively flat area with a small slope was selected to forcibly combine all the surrounding small tribal communities into a large community with approximately 300 households to facilitate the management and implementation of life culture education. Orally transmitted knowledge is generally local, collective, experiential, and holistic. Therefore, memory is the key intellectual resource in tribal community culture [10].

After losing the link with land management and the free environment of transmission, the tribal community's ability to manage forests was almost completely removed at that time. The original autonomous structure of the tribal community could no longer function, and the original ecology balance mechanism that was based on forests and tribal communities ceased to exist. Fortunately, the Paiwan tribal community is located in Taiwan, which has a tropical monsoon climate; most of the forests that were located close to the community had no precious trees, and only a few of them were stout camphor forests. The impression of the local people was that the Japanese government did not conduct large-scale forest resource exploitation that affected the Paiwan tribe.

In 1945, the Empire of Japan withdrew from Taiwan entirely. With regard to the management of the indigenous people in Pingtung County, the succeeding government continued the model used by the Japanese government to calm rebellions. For tribal community management, the principle of centralized management was adopted. Furthermore, the collective migration of the tribal community to the hilly forest zone near the plain area, which was originally planned by the Japanese government (1), was carried out by the succeeding government. The justifications for this migration included the dangerous terrain and barren soil conditions in the mountainous area that the community lived in and the difficulties in improving agricultural management, transportation, and living facilities. In summary, the government exercised its power to move indigenous communities out of the alpine forest areas that they had been living in for a long time. Through various means such as semi-oppression, subsidies, and incentives, numerous indigenous tribe communities were persuaded to move out of their original living areas, which they had lived in for hundreds of years or even longer. Under these circumstances, the Paiwan tribe community gradually moved to a hilly woodland that was located near a plain in 1976.

However, because the new area did not contain public arable land, such that the ownership of arable land in the traditional regions could not be proportionally converted (in terms of land area) into ownership of arable land in the new area, the strategy adopted by the government was to relocate the residential area of the tribal community while retaining and reserving the arable area in the original living area for the tribal community. At that time, the forest area where the community was located was completely owned by the state and subjected to an expansion. During the process of land privatization, the area owned by individuals was limited.

2.2. Relationship between Land Management and Forest in the Paiwan Tribal Community. If the forest is located within the traditional territory of a tribal community, community members can use forest products in accordance with their traditional customs. However, after a tribal community is separated from its land, their access to the forest is greatly reduced [11]. Additionally, a few residents still lived self-sufficient lives in the traditional regions of the tribe by engaging in traditional crop farming, hunting, and medicinal plant gathering. With a sparse population, the area of cultivated land decreased. Given that large areas of land had been abandoned for a long time, the forest area naturally expanded, and the cultivated area was gradually taken over by forest trees. After approximately 20 years of recuperation, the trees in the forest have grown into towering trees. In this environment, where people, animals, and plants have lived together for thousands of years, the roles played by tribe community residents in ecological balance have gradually disappeared following the implementation of the national relocation policy. The culture produced through the interactions between the tribe community and the environment has also diminished accordingly.

After 1990, businessmen in the wood industry identified a business opportunity involving the deforestation of private land and negotiated with private landlords to purchase trees from such lands for farming and animal husbandry. For a period of time, numerous deforestation projects were conducted in the traditional regions of the tribal community, and the government also granted approval for deforestation on the basis of loose guidelines.

During the decades of deforestation, no one in the tribal community cared about how their land could be utilized after deforestation because of the economic benefits that they gained from deforestation, even though these benefits were limited. With this highly passive attitude, the tribal community residents were expecting weeds and pioneer tree species to grow naturally. They were apathetic about the loss of land due to heavy rain. Instead, they were happy with the limited income that they received. Because most tribal community residents have moved to cities and towns to work as low-level laborers, interactions between the community and their land were limited. Furthermore, the residents had no economic incentive to utilize their land. This situation continued until the forests were fully deforested. The government was also alarmed by the severity of the deforestation problem after they found out that the land in the traditional regions of the tribal community was full of excavated and cleared surfaces. Hence, they began to strictly restrict the deforestation of private land [12].

Similar to how other resources with direct value for humans are protected, the conservation of forest resources involves a complex socio-ecological system; therefore, prudent decision-making is required [8]. Initially, tribal community residents did not understand why the government introduced the private land logging prohibition policy. Moreover, when the tribal community moved to the woodlands on the hills, there were no or only a few trees on the agricultural lands in the mountains where they used to live in; following the subsequent cessation of farming, trees grew naturally on these lands, and these trees attracted timber merchants to purchase them and acquire economic benefits, which was a positive development for the landlords.

However, the tribal community residents' unfamiliarity with the land that they moved to prevented them from understanding the various land protection measures that their tribespeople previously implemented in their traditional territory. These measures included the tribal community's rigorous flood control facilities for land management that were built when they were farming in traditional territory, i.e., the construction of each slope involved layers of terraced rocks that were placed to block heavy rain and floods, such that direct and strong scouring to the topsoil can be prevented. Recent scientific research has revealed that terraces not only stop water flow but also prevent soil erosion [13]. Therefore, in terms of overall landform, their cultivation over the past hundred years has not caused large-scale rain erosion leading to land loss. Arguably, the tribal community's land management was integrated into the ecology as a whole and played a role in balancing it; human habitation did not alter the land strata or disrupt the balance of existence of surrounding species.

Lawler stated that the government's willingness to help enables the sustainable development of tribal community

forestry; the second factor for such development is meaningful timing, adequate deadlines, environmental safety, and most crucially, the decentralization of governance responsibilities [14]. Therefore, if the government had interacted with the community while taking into account the aforementioned factors, it probably could have increased the community's willingness to cooperate with respect to the relevant policy amendments and learn more about the traditional knowledge for maintaining a balanced relationship between the local community and the trees; consequently, the poor communication with the tribal community during the government's implementation of policy changes (i.e., shift from the authorization of deforestation by timber merchants to the complete ban on deforestation) could have been avoided. Furthermore, the tribal community would not have been displaced from their traditional territory because of the government's persistent implementation of village relocation in the early years, which gradually reduced the tribal community's ability to undertake independent forest management and exposed them to unpredictable external impacts, allowing timber merchants to completely deforest the traditional territory where the community had lived in for an extremely small profit. Because of the government's failure to adequately consider the community's rights and interests, negligence in developing its ability to restore traditional self-management, and disregard for other methods involving multiple-use forest management, the damage to the trees and lands of the community persisted, leading to the unfortunate failure of the tribal community, which had resided there for thousands of years, to maintain local sustainable development.

2.3. Effect of Government Forest Management on Tribal Community Management.
Direct payments for ecosystem protection are increased in popularity because of their high effectiveness; specifically, it is more targeted and conditional, especially for governments that lack effective command and control measures [5]. Therefore, the government proposed a two-stage forest protection policy after recognizing the crisis pertaining to the country's overall territorial security, which was associated with its arbitrary approval of deforestation proposals and the large-scale deforestation of private forest lands.

The first-stage forest protection policy stipulates a ban on deforestation in catchment areas and the granting of subsidies through an afforestation subsidy policy.

The second-stage forest protection policy subsidizes the complete ban of deforestation on private lands.

The two stages of the aforementioned subsidization policy attained and even exceeded the subsidization goal set by the government. Specifically, the second stage was more popular than the first. Applications were made for almost all the land categories pertaining to forest land. Moreover, some landowners attempted to obtain more subsidies and applied for land use change, which converts the status of agricultural and pasture land with trees into that of forest land, to facilitate their subsidy applications. Under the current laws and regulations, such changes are considerably difficult to

reverse once they are made. Consequently, the conversion of large plots of agricultural and pasture lands into forest lands restricted the legitimization of farm land, which increased the alienation of the tribal community residents from their lands, especially for the next generation of landowners whose lives were primarily based in towns. These residents were only concerned about the subsidies for afforestation and the ban on deforestation, and they lacked a clear understanding of the location or current forest growth of their lands. At that point, the government had attained its goal of afforestation, but the initial tribal community residents were distanced from their lands, leading to their negligence of land management, which caused unforested agricultural and pasture lands to fall into disuse. No remedies or improvements were proposed to address this problem. Meanwhile, the culture, living habits, and oral history of the indigenous community residents in relation to their lands were disappearing rapidly. The distancing is such that they held feelings only for the original relocated sites and only regarded the surrounding private forest lands and agricultural and pasture lands as sources of subsidies for afforestation and the ban on deforestation. If this situation persists, the original tribal community residents will inevitably disappear from their traditional territories [15]. Forests are home to most of the tribal communities and minorities worldwide. In fact, forests are crucial for tribal communities because the forests that they inhabit provide them with the necessities of life (e.g., food and water) and enable them to form cultures, engage in recreational activities, and build their histories. Through their extensive experience with respect to forest life, tribal communities have developed an impressive foundation of practical knowledge regarding their environment. When it is managed properly, this knowledge can be employed in forest policy formulation, conflict resolution, sustainable natural resource management, and the development of novel technologies to achieve enhanced results [16–18].

2.4. Effect of Opening Up to Tourism on Communities' Forest Management.
The actual relations between tribal communities and the natural environment are highly diverse; such relations vary in terms of social and customary aspects and among locations. With a social hierarchy that is diversified and provides a sense of belonging, indigenous tribal peoples may hold greater respect toward their local environment than most societies because of their close bonds to their ancestral lands, their common system of property management, and their awareness of land trusteeship for future generations [19]. Therefore, the sustainable development of tribal communities is a challenge that requires an immediate solution.

Over time, the government of Taiwan lifted entry restrictions to mountainous areas and loosened approval requirements for entry into most mountainous areas. Moreover, the service industry formed a general trend among Taiwan's industries, and the number of leisure activities held in mountain forests gradually increased, particularly after the 2-day weekend was fully implemented in

Taiwan on January 1, 2001. Therefore, in line with the public's expectations, the government began to invest resources into developing mountainous areas.

To support the start-up tourism industry, the Paiwan Tribal Community Development Association acted as the leading organization. A working group was formed under the guidance of the chairperson of the association. Comprehensive assistance was provided by the township office and county government with respect to staff training, the restoration of on-site slate houses, and the construction of public facilities. Moreover, the Maolin National Scenic Area Administration (MNSAA) later designated the area as a site that would receive prioritized tourism promotion guidance. Negative effects also emerged with the increase in tourist numbers; they included concerns about safety and hygiene in the context of the incomplete infrastructure of the tribal community. Additionally, with easy access to the site and the surrounding mountains and forests, some tourists began to perform illegal acts such as randomly collecting precious forest trees, plants, and minerals on the mountains; hunting animals and centipedes; and even arbitrarily occupying public and private land to facilitate frequent visits to leisure areas.

Some travelers relied on their extensive legal knowledge and favorable media relations to assert that transportation facilities, mountains, and water are all public goods that should be shared by all citizens, i.e., no one should be prohibited from accessing these areas. When the tribal community did not comply with the demands of these travelers, these travelers called in the media to cover this news. The descriptions and texts accompanying the broadcasted images were highly offensive, with statements such as "What era are we living in? Why are there people who act like kings of their mountain fortresses in Taiwan? They forcibly occupy and claim forest resources."

Given the key role of tribal communities in the conservation of biodiversity, local community empowerment must be recognized. This is an opportunity for the tribe to steadily enhance their territory and natural resource control and obtain full access to relevant information and technology. Notably, legal and enforceable rights related to land and water provide communities with economic incentives and a legal basis for governance [10]. Therefore, the Majia Township Office recently implemented the demarcation of natural and cultural scenic areas, and applied to the Pingtung County Government for approval to designate the road leading to the Paiwan and Makazayazaya tribal communities as a township-level fifth special road Sisaumaqa Djalan with regulated access in accordance with local self-governing provisions. However, at the time of writing, the related enforcement methods are still undergoing modifications.

Meanwhile, the forestry-related government agencies were ineffective in controlling access to mountainous areas because numerous visitors entered them via the open entrance of state-owned mountainous areas, and the insufficient number of patrolmen has prevented the enforcement of mountainous area access control regulations relating to entry permit requirements.

Tribal communities face explicit and implicit oppression with respect to their traditional territories [20], and they generally fail to implement successful ecotourism projects because of many factors, including isolation as well as the lack of financial resources, management skills, and infrastructure. The use of complementary economic instruments and promotion of the so-called charismatic endemic species may be key factors for maximizing revenue from ecotourism activities [4]. Therefore, challenges related to tribal tourism promotion must be overcome. In the past, the traditional territories of tribal communities were only used for self-sufficient agriculture, hunting, and food gathering. By contrast, tourism promotion provides tribal communities with a brand-new domain for survival and development, which induces interactions between traditional territories and the outside world. To generate economic benefits, the utilization of resources in the traditional territories by tribal communities is considered, allowing them to return to and live in these territories and to extend their feelings and cultures in relation to their lands.

3. Methodology and Sample

In the present study, a qualitative research design was adopted. The methodological foundation was from the intersection of Sociology and Politics and Anthropology. Since the issue we explored is a societal wide and complex issue for environmental protection (which is largely related to the special issue), and at the intersection of ethnic and governmental and technological imperatives, it is important to adopt a whole-oriented approach to cover as much concerns as possible. In the present study, the studied community's application of blockchain technology in forest management and tourism promotion was examined. The researchers attended the ministerial conferences, sacrificial ceremonies, and Church events held by the studied community and conducted in-depth interviews with community residents. These methods were adopted to understand the traditional forest management knowledge that the tribe had accumulated and the state of their blockchain information platform usage; they were also used to analyze the sustainable forest management practices of the studied tribal community.

The sample, Paiwan tribe community (the Paiwan ethnic group is an indigenous ethnic group in Taiwan, and the Paiwan tribe community has the same name as the Paiwan ethnic group), belongs to Taiwan's indigenous Paiwan ethnic group and serves as the subject of the present study. This community was selected mainly because its living area had changed tremendously during the process of modernization. The community was separated from the mountain forest that they live in by forceful eviction, and its tribal residents have been moving to cities and towns to make a living for decades because of social changes. These residents undertook basic labor work in cities and towns. Thus, the original mountain living habits and cultural traditions of these people have almost been fully forgotten. Because of Taiwan's economic growth in the past decade, the transportation and environmental infrastructures in traditional living areas (i.e., those that the aforementioned residents originally moved out of) have improved. This development has enabled community residents to live their lives between their

traditional communities and current places of residence. Furthermore, modern technological developments such as blockchain technology can enhance a community's traditional community-building abilities. Blockchain technology can be used to integrate the surrounding resources of a community and create a common platform for demand and supply.

4. The Narrative Results and Analysis of Adopting Blockchain Technology

The forest is an area of high engagement with numerous stakeholders. They also contribute substantially to the climate and are crucial for sustainable development in terms of resources, biodiversity, and other factors. By contrast, for the forests of today, managerial decision-making is generally guided by top-down organizational processes in which only some stakeholders are involved; however, the stakeholders who are seldom or not involved in decision-making are still affected by the decisions that are made. At the same time, the process of digital transformations takes place in almost all domains; it provides new methods of engagement and demonstrates how people can secure their interests. In this context, blockchain technology must be introduced and promoted [21].

Blockchain technology provides value by sharing the transactions recorded in a ledger and providing secure and auditable information through the issuance of a verifiable and time-stamped record of transactions [22]. These transactions are verified through a process that is consistent with the consensus rules of a network. After a new record is verified and incorporated to a blockchain, multiple copies are established in a decentralized manner, thus creating a chain of trust [23].

Tribal community residents position themselves as the guardians or protectors of the environment, and they have undertaken activities aimed at restoring degraded ecosystems and preventing further ecological damage [20]. Tribal communities generally have an extensive knowledge and understanding of local flora, fauna, and ecological processes, which were accumulated through observation, practice, and cultural transmission across generations [18, 24]. For the conservation and sustainable management of ecosystems and species, community-based conservation is increasingly being recognized as a key global force [25]. Tribal community involvement in forest development and protection is now a core component of global sustainable development efforts. Indigenous communities are culturally and spiritually connected to the forests in which they reside, and traditional land rights and community participation in forest management form the foundation for their values and lifestyles [14].

Since the 1990s, numerous people-centered protection strategies have emerged under the influence of trends relating to democracy and human rights. They emphasize the role of local people as stakeholders in resource management (e.g., bottom-up approach and public engagement). The rationale for engagement is that local people not only benefit from participatory resource management but also contribute to sustainable natural resource governance. Among the discussed concepts, community-based natural resource management accentuates the key role of local participation in natural resource management, which has become the primary concept [26].

The long-term effects of the government's afforestation policy and village relocation programs have separated tribal communities from their original traditional territories and altered their lifestyles. These effects have considerably changed the land management model of tribal communities. Given the diversity of modern career options, traditional agriculture is no longer a practical means of earning money. In this situation, the tribal community residents appear to be gradually losing their original living skills and habits that enable them to coexist in harmony with the forest. Accordingly, the development of tourism provides an opportunity for the status quo to be changed. Therefore, in community forest management and the application of blockchain platforms, tourism development is held as a goal of sustainable development.

The MNSAA is a national-level agency that specializes in assisting local communities with tourism development. It is involved in infrastructure construction and provides guidance relating to tourism operations. For tourism promotion, in addition to infrastructure construction, tourism product marketing is a key focus of the MNSAA, which promotes beautiful local mountains, waters, and sceneries, thereby attracting people to visit the Paiwan tribal community's traditional territories for leisure activities. To enable people to quickly access tourism-related information on the MNSAA website, a blockchain platform was used to establish a connection with the tribal community, and this platform was combined with other networks and digital media.

In addition to national-level agencies, local governments have also demonstrated their commitment to tourism promotion. For example, Majia Township Office, a local government office, has promoted the implementation of policies regarding establishing special roads for tourism purposes combined with the centralized management of travelers. Specifically, all people traveling into the mountain must take a shuttle at the shuttle stops set up by the Office. The number of travelers allowed to visit the mountain is subjected to a quota, and the routes of travel are controlled to ensure that the quality of tourism activities is not compromised by overcrowding in the mountain, and that these activities can be restricted to specific sites. Accordingly, a blockchain platform may be established for shuttle schedules and visitor quotas to enable community members to provide tourism services and allocate administrative resources in an appropriate manner at an early stage, thereby preventing the waste of resources, improving waste management, and enhancing environmental protection.

With the assistance of the central and local governments, the Paiwan community applied a blockchain platform to fulfil the following aspects of management.

(1) Informatization of stories about the forests and land: The first step of informatization is to compile and

informatize all historical events and ancient myths in the realm of tradition, such that guides can quickly familiarize themselves with these stories. These stories are further categorized to facilitate the appropriate assignment of stories to guides on the basis of their expertise. These stories reveal the bonding between people and the land over the last hundreds and even thousands of years, and travelers may choose their guides and itineraries through a blockchain platform. Story compilation enables travelers to learn about the beautiful stories of the mountain and the traditions of the local community, and it also enhances the cultural identity and confidence of community residents.

(2) Centralized management and informatization of private forests: The management of private forests has shifted from a laissez-faire model to the effective use of forests resources. Forests with sightseeing value are incorporated into travel routes, and information about these forests is uploaded to the blockchain platform. This allows travelers to learn about the features and the difficulty level of each hiking trail in the forests online and select a trail in advance on the basis of their physical conditions, which greatly improves their experiences in the forests.

(3) Informatization of unique service items: Travelers who wish to experience deep travel and stay for a few days in the community can make arrangements to stay in local traditional stone slab houses that are more than 100 years old rather than in tourist accommodations in scenic areas (e.g., beautifully constructed chalets or high-end, exquisite concrete-based buildings). This arrangement allows travelers to experience how the community has integrated itself into the local ecosystem and made effective use of local resources while maintaining a respectful relationship with the environment in terms of their housing. The accommodation options are informatized and categorized at several levels; their capacity is defined; and their features are incorporated into the blockchain platform to provide a diverse selection of accommodation options.

(4) Supply chain integration for food ingredients and catering services: Local food ingredients are used in the dishes prepared for travelers. This promotes the traditional cooking techniques of the Paiwan community and provides incentives for the community to use lands that are designated for farming and grazing purposes, which help to balance plant ecology and recreate the bond between the community members and their land [27]. Cioca et al. [27] argued that customers do not pay more or sacrifice quality, convenience, or their brand preferences for social enterprise products, indicating that they do not focus on social enterprises when making purchases and are instead more concerned with the product and its brand, comfort, and price. Accordingly, the intention of customers to purchase must be emphasized in the

development of products of public interest. The Paiwan community has created a blockchain for food ingredients that includes the cultivation and harvesting of ingredients, the demonstration of suitable cooking techniques, and ingredients that go well together. The blockchain increases the transparency of the food products and allows travelers to decide on the combination of food ingredients that they wish to sample before making purchases in the community.

Hipwell suggested that the following six tasks must be completed to achieve sustainable development. (1) The scale of a development activity must be small enough such that the local community can manage it without external assistance. (2) Such an activity requires active participation by general and representative members of the community. (3) The activity must generate actual benefits for the overall participants. (4) The activity must lead to a fair and general (optimal) improvement in the quality of life of community members. (5) The results of the activity must contribute to environmental protection and preservation. (6) The activity must enhance the maintenance or improvement of the cultural environment of the community [20]. Sustainable development emphasizes environmental protection, and it helps to alleviate the worsening state of global warming and climate change [28]. Numerous communities hope to manage their forest resources in a more general manner and shift their focus away from wood materials [29].

The Paiwan community has long lacked the technical capacity and experience to market its products. For example, community members value the culture of sharing; they farm mainly to maintain self-sufficiency and to share resources with their friends and family, and they lack practical experience in a production model that aims to achieve economically feasible yields and supply for the market. Therefore, income from farming is generally low for community members, which naturally leads to a lack of experience in crop marketing. Furthermore, they are hesitant about complementing their own crops and handcrafts. For example, they are unlikely to say that they grow the best, most delicious, or freshest vegetables or fruits in their area; proactively market their products at the market or to vendors; or organize food sampling events for their crops. To address the community's disadvantage in marketing, a community network-based blockchain platform was established and connected with a governmental marketing aid to provide preorder services and facilitate horizontal and vertical marketing. The blockchain platform greatly benefits the community in terms of redeveloping agriculture in the traditional region and restoring their biodiverse forest environment.

5. Long-Term Effects of a Sharing Culture on the Community's Sustainable Development

Becker maintained that indigenous communities typically make common property decisions that balance individual and community benefits [3]. Three types of incentives motivate people to participate in voluntary organizations, namely material, solidary, and purposive incentives [30].

The Paiwan community has long valued the culture of sharing, which has helped the community to sustain and continue their bloodline in difficult and barren environments. In a self-sufficient scenario where no external resource is available, sharing is the best means to provide for the community because it facilitates adequate exchange and utilization of resources. For example, *mazazeliuliulj* (a traditional task assignment system that involves arranging the order of tasks according to their urgency, with community members taking turns to work on the most urgent task until it is finished before moving to the next task) is a common practice in the community that utilizes labor sharing to provide collective support to families who have the most urgent tasks to complete. *Mazazeliuliulj* enables labor-intensive work (e.g., harvesting and the building of stone slab houses) to be completed in an effective manner. In the traditional hunting culture of the Paiwan community, the hunters move in groups, and a successfully hunted animal is cut into multiple pieces and shared with specific community members such that the old, disadvantaged, women, children, and families who have endured tragic events can all enjoy fresh meat. Collective restraints are also realized through the sharing of control over specific resources, which allows all community members to issue warnings and report on violations of rules concerning controlled resources in any area of the community, thereby effectively preventing unauthorized entry into the forests during nonhunting seasons or nonritual periods. This practice provides the local flora and fauna with adequate time to grow and reproduce and thus prevents the deterioration or loss of forest resources.

With the culture of the community serving as a foundation, sustainable development education can be implemented to encourage community members to respect lives, care for the Earth, and care for the Earth's community of life. These concepts are closely associated with the fundamental value of sharing, the principles of bioethics, and the knowledge of sustainable development [31].

A sharing culture should be promoted in everyday life and education to facilitate the centralized management of all travel routes in the promotion of the use of forest resources for tourism. Specifically, the potential effect of tourism on the mountain environment can be effectively controlled to allow for the sharing of sightseeing resources among all community members and prevent free competition among individuals [32]. Such free competition may encourage everyone to develop their own secret forest trails in an unrestrained manner; the use of such trails generates man-made waste that would be disorderly scattered across the forests and thus affect the environment and the growth of organisms.

6. Using Contemporary Scientific Methods and Equipment to Enhance the Community's Ability to Manage Forests

Community members have achieved a balance between their lives and the surrounding forest environment through their long-term interaction with it, and thus they have their own practices and experience with respect to sustainable forest management and development. However, this experience is challenging to apply or passed on. Accordingly, contemporary management methods and technological equipment are required to improve the community's traditional forest management ability. For example, when young indigenous people return to the community after spending some time living in cities, they may be unable to obtain accurate information about the community or its forest management measures quickly through life experience or oral history. This is because learning from life experience typically takes a long time, and the loss of information can occur during the passing on of oral history because of the differences in language use between the young and old members of the community. In addition, smoke signals, calling out, and wrapping ribbons around trees are all means through which messages are conveyed by community members. However, the messages conveyed through such means can be obscured by the distance or unclarity of the signals. With contemporary technological advancements, the community can improve the effectiveness of its forest management through contemporary scientific methods, equipment, and blockchain platforms.

(1) Establishing a talent database blockchain platform for the Paiwan community development association: This step involves the convening of an implementation team, compilation of the skills of the community members, and appointment of members to appropriate positions on the basis of their skills to maximize their contributions to the community [33]. Therefore, skill-related information of the community members (e.g., education background, experience, expertise, and special skills) can be digitalized to enable the clear presentation of their credentials, which serves as the basis for their appointment to appropriate positions; the aforementioned processes are all completed online. The incorporation of these skill data into the blockchain facilitates bilateral communication and coordination with organizations that are looking to fill their job vacancies. For example, in the case of river trekking arrangements, digitalized data enable quick access to information about guides, river trekking sites, and safety instructions.

(2) Creating a resource network through blockchains: This step involves the formation of a dense network comprising related organizations and the police and fire departments, and this is achieved through the incorporation of their data into a blockchain. The network allows for the real-time exchange of information, such that timely responses and support can be provided to ensure the safety of community members [34]. Accordingly, resource allocation and interconnections within a blockchain carry multiple meanings in various places. For project management in a blockchain website, arrangements must be made for all project activities and the resources required for each activity (to determine which activities should be advanced or delayed), with the aim of achieving

project goals and minimizing the time required to complete resource-constrained activities [35].

(3) Establishing an inquiry platform for the community: The incorporation of information about the Paiwan community into a website enables individuals to access real-time information about events and developments related to the community through their personal devices. An inquiry response platform should be established, and this platform should be supported by personnel who are dedicated to providing comprehensive responses to receive inquiries [36]. Hough and Spillan [36] suggested that effective crisis management can be realized by establishing a crisis team, analyzing loopholes, formulating strategies and plans, and evaluating the performance of plans. For tourism, a blockchain platform provides a high degree of convenience; however, human involvement is still required because a blockchain only provides general information, and personnel are required to respond to unanticipated situations. When travelers visit the community, they are expected to hike, hunt, and learn about mountainous plants in the forests, and human involvement is a necessary component for such a diverse itinerary because these travelers will make inquiries that require human responses during their trip [37].

(4) Establishing a blockchain for crisis management: This step involves providing appropriate support and guidance at the project management level and establishing a risk management culture in relation to the overall organization, resources, and scheduling. During the project implementation process, high standards should be established for risk management, and connections should be made with related organizations while making continual improvements to the project and providing updates on its progress [38]. Data from Taiwan's Central Weather Bureau and strategic forest management organizations can be incorporated. For example, a blockchain can facilitate the prediction of typhoons, floods, and landslides [36] and enable project members to access all related information through their computers and phones.

(5) Establishing a blockchain for transportation network information: This step involves providing multiple travel options by consolidating the available transportation options (i.e., Taiwan Railways, Taiwan High Speed Rail, and buses) for travelers in accordance with their travel plans [39]. To prevent road accidents on the Sisaumaqa Djalan Road (previous accidents were primarily due to human error) and ensure the safety of the shuttle vehicles that use it, comprehensive road safety instructions should be provided, investment in transportation infrastructure should be increased, and the physical and mental health of shuttle drivers should be monitored. All basic information on shuttle vehicles (e.g., age and maintenance status) and of their drivers (e.g., driving experience, predrive alcohol test results, and violation records) should be digitalized and uploaded to a transportation blockchain.

(6) Establishing a blockchain with satellite images: Sensor technology advancements and the availability of high-solution satellite images have facilitated the monitoring of changes on the Earth's surface. However, the complexity of satellite images affects the accuracy of the classification of such changes. Thus, the identification of differences is crucial. To increase the change detection accuracy of an algorithm for the aforementioned types of image features, the effective detection of changes is required, and inaccurate classification must be minimized. Map information concerning changes in height is key to improving classification precision [40]. Accordingly, satellite images should be used to enhance the community's monitoring of changes in the forests; through the utilization of readily available aerial and fixed-point photography, the community can obtain information about the distribution of forests, the conditions of sightseeing spots, and the reproductive status of various species in real time. This information can then be incorporated into the community's blockchain platform to facilitate the implementation of subsequent response measures [41].

(7) Establishing a blockchain for video surveillance equipment: In a technological environment where digital surveillance systems are ubiquitous and continuously producing large amounts of data, manual surveillance is required to identify human activities in the public realm. Meanwhile, smart surveillance systems that can identify normal and abnormal activities are urgently needed because they allow for the effective monitoring of images sent from cameras that are designed to capture abnormal activities; the implementation of these systems can alleviate the lack of surveillance personnel [42, 43]. Furthermore, the inclusion of these systems can enhance the community's control over the number of people entering the mountain and the entry of unauthorized personnel.

Green thinking has become a normal activity because all of the activities involved in green thinking are oriented toward sustainable development and are therefore conducive to environmental and social development [44]. Accordingly, with the support and appropriate application of scientific methods and technological equipment, green thinking can greatly benefit the community's tourism promotion and traditional forest management. Specifically, the traditional management methods of the community can be converted into stable data and information for the sustainable management of forests.

7. Conclusions and Recommendations

When the Paiwan community was an autonomous community, its forest management model was centered on not

affecting the wildlife; all members of the community considered how their actions might affect forest sustainability before using any forest resources. Therefore, the community did not emphasize how they should protect forests; instead, the concept and practice of environmental protection were already integrated into the everyday lives of community members, and various taboos were established to deter members from violating the related rules.

After Japan and subsequently Taiwan imposed their authority over the Paiwan community, forest management shifted toward the use of resources, with the aim of maximizing deforestation. However, the clearing of forest lands exposed the soil and rocks on the mountains, such that the detrimental effects of extreme weather on the overall environment outweighed the economic benefits gained from deforestation. Therefore, the government implemented extreme measures (e.g., the establishment of protected areas and national parks) to provide strict protection and prohibit unauthorized entry with respect to these sites. Additionally, indigenous people were relocated from the mountains on which they had lived for hundreds or even thousands of years, which deprived them of their forest-dependent livelihoods, namely hunting, harvesting, and farming. The government took over the forest resources that originally belonged to these indigenous people and relocated them away from their territory; this government policy hurt the Paiwan community, which had long been an integral part of the forest ecosystem. The government assumed that the forest would soon be restored to its original state after the indigenous people are gone; it overlooked the large-scale landslides in the mountains and forests that were caused by the large-scale deforestation that it had ordered. In response to new consumer needs resulting from economic development, the local traditional farming model of the community has shifted toward the cultivation of highly profitable crops to maximize farming profits. The community's farming area was expanded excessively and flood control measures were inadequate, which reduced the resistance of their lands to extreme weather conditions and hence soil and rock erosion.

The protection of mountainous forests involves not just forests but all the flora and fauna that are found in them. The excessive reproduction of a species may create an ecological imbalance that is detrimental to the forest environment. From the perspective of human rights, the government should not have sacrificed the rights of the minority for the purpose of implementing national policies.

According to the results of the present study, effective forest protection is only possible if the Paiwan community returns to its traditional living model, which focuses on striking an ecological balance in the forest, emphasizes a sharing culture, and, most importantly, incorporates the use of contemporary technological equipment, information processing methods, and management methods and knowledge. For example, blockchain technology can help the community to manage forests, ensure forest sustainability, minimize deforestation, and enhance the tourism value of forests, thereby expanding the role of forests as a source of materials to encompass all the organisms that are found in them. Accordingly, forest protection should move beyond

the conventional centralized strategy. Typically, the government can close off a forest area or subject it to stringent controls without considering in depth the specific needs of each mountain; this strategy has been proven to be ineffective. Therefore, protection policies must be customized for each forest through an in-depth understanding of its environment. Contemporary technologies should be used to informatize and digitalize all types of information and develop blockchains for various information-related purposes. This strategy considers all the organisms that live in forests, and it is a sign of respect for the indigenous communities who have been living in forests, their lifestyle of coexistence with the forests, and their self-management culture.

Data Availability

Historical data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Hindawi

Research Article

Research on the Impact Evaluation of Digital Finance on the Synergy between Economic Development and Ecological Environment

Feng Yuan (ID)

School of Economics and Management, JiLin Engineering Normal University, Changchun 130052, China

Correspondence should be addressed to Feng Yuan; tony16095@jlenu.edu.cn

Following rapid growth, China's economy is entering a period of high-quality economic growth. High-quality economic development has a profound impact on China's current economic development. It can be said that the improvement of economic quality is an inevitable choice for China's new stage of economic development. From this point of view, promoting high-quality economic development has become an important practical issue in my country's current economic and social development. As the integration and innovation of digital technology and taxation, the blessing of digital technology maximizes integration and precision, which can effectively meet the needs of higher stages of economic development. Perfect and inclusive development has become an important support for sustainable and healthy economic development. At present, behind the rapid economic growth, human economic activities have led to the emergence of an ecological and environmental crisis. The growth mode characterized by high input, high consumption support, and high emissions has resulted in insufficient supply of regional ecological and environmental resources, pollution, and damage to the ecological environment and also intensified. Therefore, this paper first examines the concept of digital finance and its enlightenment to economic development, and believes that digital finance has a good role in promoting economic development. Second, an evaluation model for the relationship between environmental environment and economic development is established, and an evaluation index system is obtained. Finally, through the comprehensive evaluation and analysis of economic development and ecological environment, it is concluded that in the era of digital finance, the level of regional economic development has been greatly improved, and my country's regional economic development has been greatly improved, which is significantly faster than my country's ecological environment improvement level.

1. Introduction

This note highlights some of the latest developments in this rapidly changing field, and given the nascent and rapidly evolving stages of financial services for smallholder farmers, it is too early to draw firm conclusions from the examples to date. This suggests that the success of mobile-enabled financial services may largely depend on a number of factors [1]. In the past few decades, the financial services industry has developed with the development of digitalization, which is characterized by the improved connectivity and speed of data processing in customer interface and back-office process. Recently, the focus of digitalization has shifted from improving the performance of traditional tasks to bringing new business opportunities and models to financial service providers [2]. Currently, some of the issues related to digital finance are areas that have not been critically addressed in the literature, and if addressed, digital finance can better serve individuals, businesses, and governments [3]. After the financial crisis ended from 2007 to 2010, the financial services industry began to accelerate its transformation. The new business model based on the development of converged technology challenges the current situation of the old traditional industries. It is necessary to review the latest developments in financial services and discuss how these developments affect the financing channels of enterprises

and individuals [4]. Today, global finance is the paragon of digital life, a system of knowledge, institutions, and practices whose existence depends on the seamless flow of binary data that intertwine investors, analysts, and trading venues around the world, and digital technology and the various forms of action that take place through digital technologies clearly define contemporary finance [5]. As one of the key areas of domestic scientific development, the government pays special attention to the creation and development of digital technology such as the ability to process large amounts of data, which can accelerate economic growth and maintain national security, including financial security [6]. Through empirical methods and measurements, we find that the impact of human capital on China's economic growth can be achieved indirectly by investing in physical capital, which is different from the performance of OECD countries, a finding that has some implications for China's future regional growth inequality [7]. We analyse the role of law in the economy and assess whether China's formal legal system contributes to stable and predictable expectations of property and contractual rights, a prerequisite for economic growth. The relationship between law and economic development is bidirectional and is a co-evolutionary process [8]. As important regional policies and mechanisms, prefecture-level cities are playing an increasingly important role in China's economic development. Based on Chen Ri's theory of economic development, this paper defines China's economic development from the national and regional levels [9]. After the reform and opening up, our country has developed rapidly. The traditional economic growth model of investment, high consumption, and high emission has led to the increasingly prominent contradiction between China's economic growth and the environment. Empirical studies have shown that the relationship between major pollutant emissions and per capita national income in China does not follow the typical EKC [10]. Based on the economic quality and development growth theory, this paper provides a framework for describing economic development in detail, including physical capital, natural capital, and intellectual capital. The results show that since the reform and opening up, all forms of capital growth have been faster than economic growth [11]. Everyone in the world is completely dependent on Earth's ecosystems and the services they provide, human changes in these ecosystems over the past 50 years have been faster and more extensive than at any time in human history, and many ecosystem services are now degraded, due to actions taken to increase the supply of other services, such as food [12]. Research on fragmented ecosystems has focused on the biogeographical consequences of the formation of habitat "islands" of varying sizes, with little practical value to managers. Therefore, management and research on fragmented ecosystems should focus on understanding and controlling these external influences, and there is an urgent need to develop an integrated landscape management approach that places protected areas in the context of the overall landscape [13]. Data on ecosystem goods and services usually appear on incompatible analytical scales, and a standardized reference framework for comprehensive assessment of ecosystem performance is needed
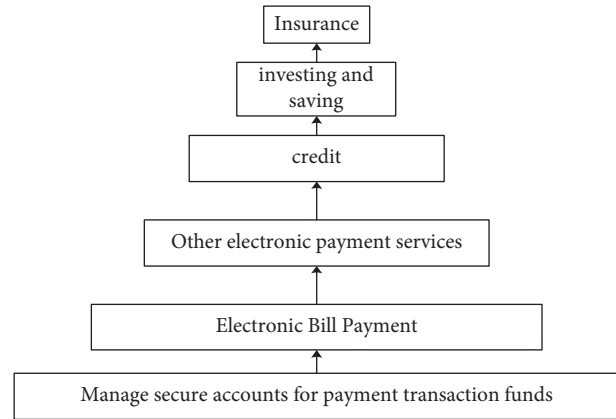
FIGURE 1: Hierarchy of financial services demand.

for comparative eco-economic analysis. The second part provides an inventory and matrix that integrate these ecosystem services with key ecological, sociocultural, and economic assessment methods [14]. We review evidence for institutional change related to the resilience of complex adaptive ecosystems in terrestrial and aquatic environments, and the functional role of biodiversity in this context. Evidence suggests that the ability of an ecosystem to produce ecosystem services can suddenly shift from an ideal to a less-than-ideal state [15].

2. About the Concept of Digital Finance and Its Impact on Economic Development

2.1. Digital Finance. Digital finance is the product of combining traditional financial services with digital technologies such as next-generation Internet technology, Internet of Things, artificial intelligence, big data, cloud services, blockchain, biometrics, and cryptography. Digital finance, Internet finance, and financial technology belong to the same economic family tree. Innovation, reach, and accuracy are core characteristics of digital finance. In recent years, digital technology has entered a period of rapid development, which has also made inclusive financial services an important role in the international community. At the same time, it has solved the problem of digital economic development: "financing is expensive and financing is difficult" in the real economy. The latest practice and application of the principle of financial accelerator is the leading mechanism of economic growth in the era of financial constraints.

According to this definition, the demand for financial services is divided into different levels (Figure 1), and digital finance can be seen as a process of continuously satisfying the demand for financial services. From basic financial services such as savings guarantee and electronic payment, to more complex financial services such as bank credit, investment, and purchasing insurance, the more satisfied you are with financial services, the higher the level of inclusive development will be. Therefore, the definition and measurement of digital finance should not be limited to the process of meeting basic financial service needs, but should
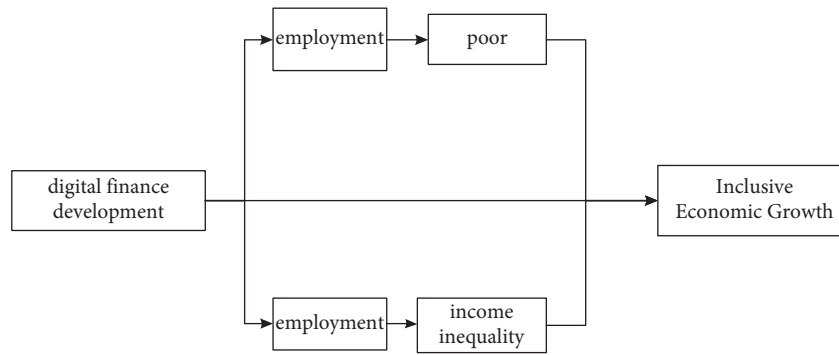
FIGURE 2: Mechanism of the role of digital financial development on inclusive economic growth.

also take into account that each target group uses a completely different level of financial services.

2.2. Theory of Economic Development.

The economic development theory takes developing countries as the research object and examines the development process of the national economy and social structure from economic growth to modernization. Compared with economic growth, economic development has more dimensions, and the economic interests of a country or region are not affected by a single source. Therefore, it can be said that economic development theory is the development and deepening of economic growth theory, emphasizing the continuity of economic activities and the balance and coordination of social development.

2.3. The Relationship between Digital Finance and High-Quality Economic Development.

Rapid economic development is inseparable from the digital transformation of the financial system. This paper explores the connection between the two, especially to determine the specific impact path of digital development on high-quality economic development. However, the current research is still in the stage of measuring the one-way advancement of digital finance. There are three reasons for this. First, the development of digital finance is inseparable from its economic core. Digital taxation is a new form of financial innovation that combines digital technology with traditional finance. Integrating it into new business formats can promote high-quality economic development. Second, due to the digital nature of digital taxation, digital taxation has special power-law characteristics in the digital age. Finally, compared with traditional taxation, digital taxation expands the scope of services, improves service efficiency, and has a greater impact on high-quality economic growth; that is, digital taxation can accelerate the awareness of high-quality economic growth.

2.4. Inclusive Growth.

Inclusive growth is a very broad concept, which is of great significance to us, which are developing rapidly. Inclusive growth has two key elements: one is the scientific and rational development of the economy, and the other is the participation of the whole society and the sharing of achievements. Inclusive growth not only pays attention to the speed of economic development but also pays attention to the sustainability of development; that is, it requires not only quantitative growth but also the coordinated development of economy, society, resources, and environment. Figure 2 examines the mechanism of my country's digital economic development from the perspective of inclusive economic growth by constructing a flowchart, illustrating that the impact of digital economic development on inclusive economic growth varies from region to region, social and ecological mutual inclusion.

3. Evaluation Model of the Coupling Relationship between Ecological Environment and Economic Development

3.1. Standardization of Evaluation Indicators.

There are units in the original evaluation index data, so the dimensions of different indicators are different and cannot be directly compared. According to the influence of different indicators on the relationship between the two, the indicators are divided into positive indicators and negative indicators, and then, the dimensionless processing is as follows:

$$x_{ij}' = \frac{x_{ij} - \min(x_{ij})}{\max(x_{ij}) - \min(x_{ij})}, \tag{1}$$

$$x_{ij}' = \frac{\max(x_{ij}) - x_{ij}}{\max(x_{ij}) - \min(x_{ij})}. \tag{2}$$

In the formula, $\max(x_{ij})$ is the maximum value of the indicator and $\min(x_{ij})$ is the minimum value of the indicator.

3.2. Determine the Weight of Evaluation Indicators.

The concept of entropy originated from heat in physics, and later social sciences used "information entropy" to measure the unknown. If the distribution of the original data of the index is large, it means that the amount of data is large, the index value is small, and the weight is large. On the contrary, the weight corresponding to the index is small. The indicators provided by the entropy method have high reliability. The

TABLE 1: Evaluation criteria for ecological environment and economic development status.

Evaluation coefficient	0–0.3	0.3–0.55	0.55–0.8	0.8–1
Evaluation criterion	Difference	Same as	Good	Excellent

specific calculation method is as follows: suppose you calculate the weight of the n indicators in a certain year of the country.

First, we determine the original matrix $X = (x_{ij})_{\min}$ and convert the original indicators into dimensionless standard values according to formulas (1) and (2). The standardized x'_{ij} is normalized, and the specific formula is as follows:

$$p_{ij} = \frac{y_{ij}}{\sum_{i=1}^{m} y_{ij}}. \tag{3}$$

Then, the entropy value and redundancy of each index are calculated so that the original index weight can be determined. Among them, entropy can be expressed as follows:

$$p_{ij} = \frac{y_{ij}}{\sum_{i=1}^{m} y_{ij}}. \tag{4}$$

Redundancy is as follows:

$$e_{ij} = \frac{1}{\ln m} \sum_{j=1}^{n} p_{ij} \ln \frac{1}{p_{ij}}. \tag{5}$$

Indicator weight calculation is as follows:

$$\lambda_j = \frac{\eta_j}{\sum_{j=1}^{n} \eta_j}. \tag{6}$$

3.3. Comprehensive Index Evaluation Model. We measure the efficiency of each subsystem to measure the ecological environment and economic development, and formulate a comprehensive evaluation model

$$U_q = \sum_{j=1}^{p} \lambda_j x_j. \tag{7}$$

Since this study includes two subsystems of the development system, we take (q = 1, 2), since x_j is the general value of the j-th initial index, and λ_j is the weight of the j-th index corresponding to the subsystem. Therefore, this study subtly divides the ecological environment and economic development into four grades according to the current evaluation standards: excellent, good, average, and poor, see Table 1 for more information.

3.4. Coupling Model and Criterion. The term coupling comes from physics, which describes the phenomenon in which two (or more) systems or modes of motion influence each other through different interactions, that is, the coordination and promotion of dynamic coupling. It is further subdivided into benign coupling and poor coupling, where benign coupling refers to benign interactions between systems or elements within a system that can be well coordinated,

otherwise poor coupling. Therefore, the relationship between ecological environment and economic development can reflect the degree of interaction and influence of the two systems in addition to the factors that affect the economic development and ecosystems of various regions.

This paper refers to the concept of physical weight and coupling and the theory of capacitive coupling coefficient, and expands it into a model for calculating the degree of multisystem interaction. The coupling coefficient is a concept in physics. In the circuit, it is expressed as the tightness of the coupling between components, which is the ratio of the actual mutual inductance (absolute value) between the two inductive components to its maximum limit value. The formula is as follows:

$$C = \left\{ \frac{(U_1 \cdot U_2) \cdots U_m}{\prod (U_i + U_j)} \right\}^{(1/m)}. \tag{8}$$

Here, U_i is the value of the extended evaluation index for each subsystem ($i = 1, 2, 3, \ldots, m$). Since the model is relatively abstract, it is still necessary to determine that the ecological environment system and economic laws include two subsystems.

In order to clarify the degree of connection, a connection formula for the degree of ecological and economic connection is proposed, as shown in the following formula:

$$C = \left\{ \frac{(U_1 \cdot U_2)}{[(U_1 + U_2/2)]^2} \right\} \quad (K \geq 2). \tag{9}$$

In the formula, A has a fitting factor, $k = 2$ in the study, and C is the coupling factor. At the same time, a coordination model of ecological environment and economic development will be introduced, which aims to reflect the connection and coordinated development level of the environmental environment system and the entire economic development system more objectively and truly. It is calculated as follows:

$$\begin{aligned} D &= (C \times T)^2, \\ T &= \alpha U_1 + \beta U_2. \end{aligned} \tag{10}$$

In formula (10), D is the degree of linkage coordination, C is the degree of linkage, T is an evaluation index reflecting the overall impact of the two systems on development, and α, β is an undefined factor. Both the economy and the environment are important to development.

3.5. Model Establishment. This research mainly uses three models to study the environmental pollution index and economic growth index. The equations corresponding to the three econometric models are as follows:

$$E_i = \alpha + \beta_1 Y + \varepsilon. \tag{11}$$

$$\begin{aligned} E_i &= \alpha + \beta_1 Y + \beta_2 Y^2 + \varepsilon, \\ E_i &= \alpha + \beta_1 Y + \beta_2 Y^2 + \beta_3 Y^3 + \varepsilon. \end{aligned} \tag{12}$$

In the above formula, E_i is each environmental pollution index (i = 1, 2, 3), Y is GDP per capita and is the correlation

coefficient; α is the model parameter; $\beta_1, \beta_2, \beta_3$ is the term of random error; equation (11) shows that economic growth and environmental pollution have a simple positive and negative linear relationship, and economic growth leads to the quality of the environment.

3.5.1. Power Function. Both the regional economy and the ecological environment system are a system composed of complex and multifaceted elements. If the contribution of each element of the system to the system development is taken as the goal of system development, the connection and coordination can be developed, and the regional economy and ecological environment can be developed. Development must be viewed as a multifunctional issue. Therefore, according to the decision-making method of the multi-objective system, N objectives can be set for the system, in which the higher the N_1 objective is, the better, the lower the N_2 objective is, and the remaining $N - N_1 - N_2$ objectives are not small and close to a certain value. The function describing the relationship between M_i and $G_i(X)$ is called a power function and is expressed as the following equation:

$$M_i = g_i[G_i(X)(i = 1, 2, \ldots, N)]. \tag{13}$$

The total power function can be used to describe the overall operation of the system, and its formula is as follows:

$$K = K(M_1, M_2, \ldots, M_M). \tag{14}$$

The higher the value of K, the better the coordination of the system, and α_{ij} and β_{ij} are the upper and lower bounds of the ordered parameters of the critical point of system stability. Then, the order parameters of each order parameter will have an impact on other links. It is expressed in the following format, that is, the higher the index value, the more positive contribution it makes to the system.

$$M(m_{ij}) = \begin{cases} 1, x_{ij} \geq \alpha_{ij}, \\ \dfrac{x_{ij} - \beta_{ij}}{\alpha_{ij} - \beta_{ij}}, & \beta_{ij} < x_{ij} < \alpha_{ij}. \\ 0, x_{ij} \leq \beta_{ij} \end{cases} \tag{15}$$

Negative efficiency indicators, that is, the higher the indicator value, the greater the negative impact on the system, include the following:

$$M(m_{ij}) = \begin{cases} 1, x_{ij} \leq \beta_{ij} \\ \dfrac{\alpha_{ij} - x_{ij}}{\alpha_{ij} - \beta_{ij}}, \beta_{ij} < x_{ij} < \alpha_{ij} \\ 0, x_{ij} \geq \alpha_{ij} \end{cases} \tag{16}$$

In formula $M(m_{ij})$, variable U_{ij} has a systematic efficiency function, $M(m_{ij})$ represents the satisfaction rate of the indicators to achieve each goal, $M(m_{ij}) = 0$ is the least satisfied, and $M(m_{ij}) = 1$ is the most satisfied, so there is

$0 \leq M(m_{ij}) \leq 1$. Using the above formula, for each in the regional economic and environmental interconnection system, the cost is marked as X, Y, T, respectively. The specific expression is shown in the following formulas:

$$X = \sum_{j=1}^{n} w_{1j} M(m_{1j}), \tag{17}$$

$$Y = \sum_{j=1}^{n} w_{2j} M(m_{2j}), \tag{18}$$

$$T = \alpha X + \beta Y. \tag{19}$$

Among them, w_{1j} is the weight in the economic subsystem; C_t is the weight in the ecological subsystem; α, β is the impact of changes in the economic and environmental subsystems on the overall development; and T is the comprehensive coordination index between economic growth and the environment, reflecting economic growth and the environment overall synergies or contributions.

3.5.2. Coupling Coordination Degree Model. The physical capacitive coupling concept and capacitive coupling coefficients are based on the model:

$$C_n = \left\{ \frac{(m_1, m_2, \ldots m_n)}{\prod(m_i + m_j)} \right\}. \tag{20}$$

Since there are only two subsystems, we can directly get the degree of coordination, which can be expressed as follows:

$$C_t = \left\{ \frac{X \cdot Y}{[(X + Y)^2]} \right\}. \tag{21}$$

It can not only evaluate the coordination degree of two regional economies and different places but also reflect the relative development level of the region. This paper calls the quantitative index the degree of linkage coordination:

$$D_t = \sqrt{(XY)^2 \cdot \left(\frac{X + Y}{2} \right)^2 \cdot T}. \tag{22}$$

Among them, n is the level factor, generally $n = 2$. The role of the liaison coordinator is to integrate the local economy and ecological environment, coordinate the development level of the atmosphere and the two, and reduce the situation of weak economic and ecological development. However, an abnormal situation has arisen between the two, and the degree of liaison coordination is more suitable for quantifying and comparing the coordinated development of regional economies and the economic links between regions and regions, and has strong operational capabilities.

4. Comprehensive Evaluation and Analysis

4.1. Evaluation and Analysis of Ecological Environment and Economic Development. This paper analyses the use of the

Table 2: Weights of evaluation indicators of China's ecological environment and economic development.

Subsystem	Evaluating indicator	Indicator weight
Ecological condition	Land area covered with trees	0.13
	Per capita green area	0.16
	Per capita water resources	0.05
	Industrial wastewater discharge volume	0.09
	Natural population growth rate	0.04
Economic development	Gross domestic product	0.15
	Local fiscal revenue	0.11
	Educational appropriations	0.04
	GDP rate of rise	0.28
	Rural per capita net income	0.13

Table 3: Comprehensive evaluation index.

A particular year	Ecological condition	Economic development
2000	0.528	0.014
2001	0.495	0.057
2002	0.458	0.111
2003	0.423	0.171
2004	0.412	0.184
2005	0.395	0.241
2006	0.341	0.311
2007	0.348	0.387
2008	0.396	0.396
2009	0.448	0.472
2010	0.494	0.549
2011	0.416	0.638
2012	0.511	0.713

Figure 3: Trend of comprehensive evaluation index changes.

Table 4: The coverage of digital finance development from 2011 to 2018.

Class	2011	2022	2013	2014	2015	2016	2017	2018
Mean	49.08	85.32	114.7	147.5	165.5	177.2	198.7	218.1
Standard deviation	23.81	24.58	24.23	24.07	25.28	26.37	25.49	25.01
Least value	1.86	34.96	66.02	101.6	117.5	131.6	153.8	176
Crest value	99.86	158.6	189.1	220	242.9	254.1	273	290.3

index weight method to calculate the index weight of the evaluation index system, as shown in Table 2; we calculate the China Environment and Economic Development Index according to the calculation method of China's overall evaluation index in Section 3.3, and the results are shown in Table 3 and Figure 3.

Table 2 shows that in the ecosystem subsystem, the forest coverage rate describes the ecological capacity, industrial waste gas emissions, and fertilization intensity, and reflects the pollution of the ecological environment and its contribution to the environment. In the economic development subsystem, the weight of the two indicators in the indicator layer is greater than 0.9, which indicates a high degree of contribution to economic development.

According to the calculation results in Table 2 and the comprehensive evaluation index calculation method described in Section 3.3, the comprehensive evaluation index U_1 of China's ecology and the comprehensive evaluation index U_2 of China's economic development are calculated, as shown in Table 3, and the trend chart is drawn accordingly (see Figure 3).

As can be seen from Figure 3 and Table 3, since 2000, my country's ecological environment has experienced two stages of development: 1: the overall stage of environmental quality (2000–2006): the development of environmental quality in

this stage is unstable and changes in other years. The trend is opposite and usually varies widely. 2. Development stage with good ecological environment quality (2007–2012). Since then, the construction of the ecological environment has been guaranteed by the system. In addition, human activities have also had an impact on the ecological environment in recent years. People pay more and more attention to environmental protection, and the government is also dealing with environmental pollution in multiple directions, and the ecological environment will inevitably be improved and developed.

4.2. The Impact of Digital Finance on Economic Development. My country has now entered a new stage of normal economic development. The economic growth seems to be slower than ever, but there is still a good growth trend in general. In addition, the impact of digital taxation on China's economic development is also increasing. First, let us analyse the coverage of my country's digital finance. Table 4 and Figure 4 show the description of my country's digital finance coverage from 2011 to 2018.

The data results in Table 4 and Figure 4 show that during this period, the average, standard deviation, maximum, and minimum coverage rates of my country's digital economy development all showed an upward trend, indicating that my country's digital economy development coverage rate has increased significantly. The number of people covered by digital finance has increased
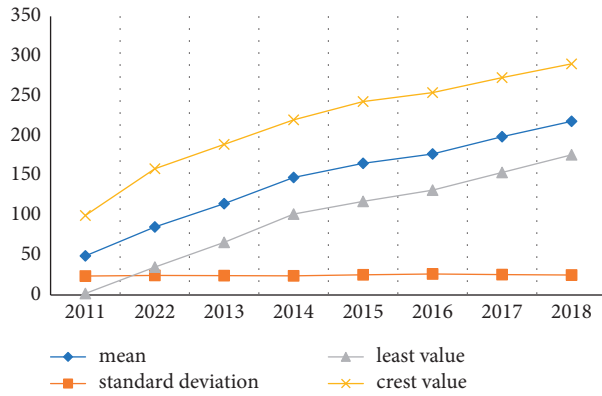
Figure 4: Trends in coverage and breadth of digital financial inclusion.

Table 5: Depth of use of digital finance development from 2011 to 2018.

Class	2011	2022	2013	2014	2015	2016	2017	2018
Mean	55.33	96.24	131.4	124.4	145.5	195.9	242.8	233.2
Standard deviation	16.59	20.93	25.32	22.6	22.27	17.47	21.45	25.19
Least value	4.29	4.12	61.06	71.06	92.72	160.2	197.3	168.2
Crest value	93.61	170.6	215.3	196.7	223.3	251.4	325.7	316.6
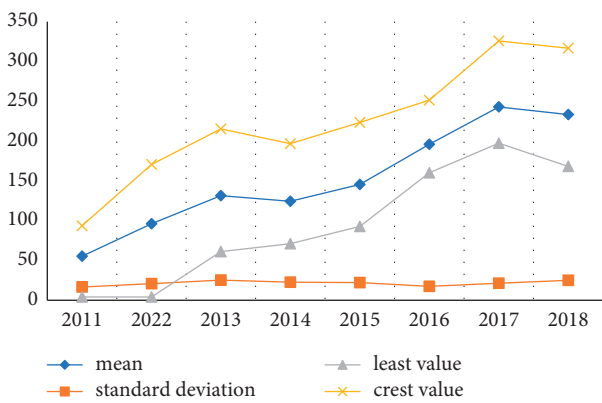
Figure 5: Depth trend of digital finance usage.

dramatically, and more and more groups are gaining access to financial products and services, contributing to their economic exclusion.

Second, let us analyse the use of digital finance in my country. Table 5 introduces the use of digital finance in my country from 2011 to 2018. The trend is shown in Figure 5.

It can be seen from Table 5 and Figure 5 that my country's digital finance is developing continuously, showing an overall upward trend. From 2011 to 2018, the standard deviation of the depth of use of digital finance remained basically unchanged, indicating that the frequency of use of digital finance has increased steadily in recent years, but the average and maximum values have increased year by year, which suggests that digital taxes began to trend upward in 2016. The use of digital finance in my country has developed rapidly since Yu'ebao was launched in 2013.

4.3. Dynamic Comparison. According to the calculation formula of interconnection coordination degree described in Section 3.4, the regional economic and ecological environment indicators in my country from 1990 to 2012 and their interconnectivity and coordination, as well as interaction types and correlations, were calculated. The stage of harmonious development of my country's regional economy and ecological environment is evaluated, and the types and stages of the relationship between regional economy and ecological environment are determined, and the representative ones are 1990, 2000, and 2012. The results are shown in Tables 6–8.

The above three tables show that from 1990 to 2012, the economy develops harmoniously, and the ecological environment is also significantly improved, especially for the type of connection, as shown in Figure 6, and the number of areas with weaker regional economies became 16-9-2; the number of synchronized areas will be changed to 10-13-16; and the number of ecologically disadvantaged areas will be changed to 3-7-11. As for the link stage, the number of regions for the low-level link stage becomes 28-11-8; the number of regions for the high-level switching stage becomes 1-15-18; and the number of break-in zones becomes 0-3-3.

4.4. Phased Comparison

4.4.1. Comparison from 1990 to 2000. From 1990 to 2000, the average level of coordination between local economy and ecological environment in the five provinces and cities was 1.4, and the coordinated development of local economy and ecological environment was relatively weak. But from the analysis of their state, the development level of my country's regional economic system and ecosystem is in a state of

TABLE 6: Coupling types and coupling stages in 1990.

Region	X	Y	C	D	Coupling type	Coordination degree	Coupling stage
Beijing	0.53	0.59	0.28	0.25	Synchronized model	Low coordination	Low-level coupling
Tianjin	0.38	0.42	0.2	0.25	Synchronized model	Low coordination	Low-level coupling
Shanghai	0.59	0.36	0.22	0.23	Environmental lag type	Low coordination	Low-level coupling
Hunan	0.34	0.47	0.2	0.24	Synchronized model	Low coordination	Low-level coupling
Sichuan	0.46	0.38	0.21	0.25	Synchronized model	Low coordination	Low-level coupling

TABLE 7: Coupling types and coupling stages in 2000.

Region	X	Y	C	D	Coupling type	Coordination degree	Coupling stage
Beijing	0.47	0.38	0.37	0.32	Synchronized model	Coordinating	High-level coupling
Tianjin	0.35	0.38	0.38	0.3	Synchronized model	Coordinating	High-level coupling
Shanghai	0.57	0.27	0.51	0.3	Environmental lag type	Low coordination	Run-in stage
Hunan	0.33	0.33	0.35	0.29	Synchronized model	Coordinating	High-level coupling
Sichuan	0.34	0.28	0.37	0.28	Synchronized model	Low coordination	Run-in stage

TABLE 8: Coupling types and coupling stages in 2012.

Region	X	Y	C	D	Coupling type	Coordination degree	Coupling stage
Beijing	0.53	0.33	0.38	0.32	Environmental lag type	In coordination	High-level coupling
Tianjin	0.46	0.33	0.41	0.32	Environmental lag type	In coordination	High-level coupling
Shanghai	0.52	0.24	0.47	0.29	Environmental lag type	Low coordination	High-level coupling
Hunan	0.41	0.37	0.41	0.32	Synchronized model	In coordination	High-level coupling
Sichuan	0.44	0.33	0.46	0.31	Environmental lag type	In coordination	High-level coupling
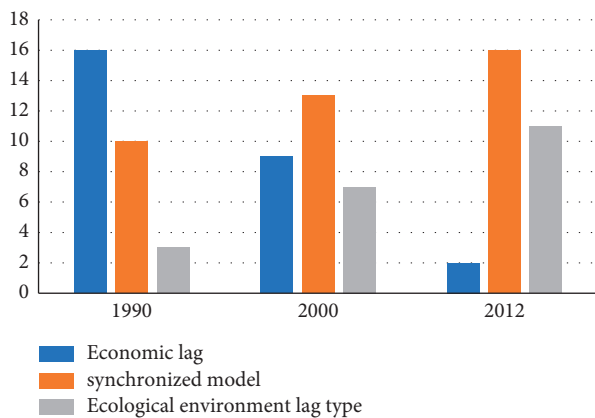
FIGURE 6: Coupling types of five provinces and cities in 1990, 2000, and 2012.

FIGURE 7: Coupling and coordinated development of regional economy and ecological environment in five provinces and cities from 1990 to 2000.

constant change, as shown in Figure 7. It can be seen that the development of the regional economic system is directly related to the development of the ecosystem and Y are the comprehensive evaluation values of the regional economic subsystem and the ecological environment subsystem, respectively; C represents the coupling degree, and D represents the coupling coordination degree.

4.4.2. Comparison of 2001–2012. From 2001 to 2012, the average score of regional economic ecology in the five provinces and cities was 0.34, which was much higher than other regions' economic development and ecological environment. Specifically, as shown in Figure 8, from 2001 to

2012, there were significant differences in the level of ecosystems and the degree of coordination between regional economies and ecosystems in different regions of the five provinces and cities. The regional economic and ecological environment level of the five provinces and cities improved.

4.5. Comprehensive Analysis Conclusion. From 1990 to 2000, the regional economic development level of the five provinces and cities was significantly improved, the adjustment of the regional economy and the ecological environment was significantly improved, and the connection between the
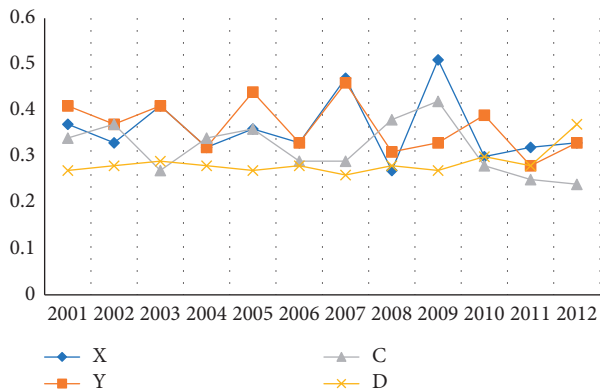
FIGURE 8: Coupling and coordinated development of regional economy and ecological environment in 5 provinces and cities from 2001 to 2012.

economy and the region was strengthened, but the development level of the ecological environment deteriorated. On the whole, the regional economic backward areas have decreased significantly, and the ecologically backward areas have increased significantly. From this, it can be concluded that the level of regional economic development in my country has been significantly improved, and the level of environmental and ecological development has deteriorated. The development of the environment has improved the linkage.

5. Conclusions

The interaction between environmental pollution and economic growth is very important for economic development. The rapid depletion of natural resources and the deterioration of ecological environment have become necessary measures to promote the coordinated and sustainable development of regional economy and environment in China, and digital finance has played an important role in promoting it. The research in this field has started abroad, and we are still in the follow-up stage of foreign research. The relationship between economy and ecological environment has been studied qualitatively and quantitatively from different angles, but there are still some shortcomings in the research: (1) the research on the relationship between economy and ecological environment in China is relatively weak and wide, and basically concentrates on the provincial, municipal, or local level. In China, the research on the relationship between economy and ecological environment rarely involves the relationship between economy and ecological environment at provincial and municipal levels; (2) domestic economic research based on relational modelling and coupling theory is still at the dominant static analysis level in economics. In the future, the research on the linkage process between regional economy and ecological environment should evolve from low-level linkage to high-level linkage, so as to better understand the dynamic process of linkage between regional economic development and ecological environment. More long-term comparative analysis of coordinated development of ecological environment and regional economy and

coordinated development in China should be carried out in stages in a long period of time.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work.

Acknowledgments

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Research Article

The Promoting Effect of Mental Health Education on Students' Social Adaptability: Implications for Environmental

Ying Jin (iD)

School of Physical Education & Health, Wenzhou University, Wenzhou, Zhejiang Province, China

Correspondence should be addressed to Ying Jin; 00361004@wzu.edu.cn

Students' mental health has always been a hot topic in colleges and universities. How to make students integrate into the collective and society faster and better is also one of the most difficult problems for educators. Students want to improve their competitiveness; not only must they have superb professional skills, but at the same time, they must have good social adaptability. Only in this way can they quickly complete their identity change and quickly adapt to workplace life. Students' social adaptability is not innate, but gradually formed through long-term positive mental health education. Considering the relationship between psychoeducation and social adaptability, in general, a good psychoeducation system is conducive to the development of students' social adaptability, and they promote each other. Good mental health education is multifaceted and sustainable for the development of social adaptability. In this context, it is necessary to formulate a targeted positive mental health education plan according to the actual situation of students, so as to comprehensively improve the comprehensive quality of students in this way.

1. Introduction

In the context of the new era, education includes not only skills teaching, but also psychological teaching, and its teaching purpose is to cultivate all-round development talents. Positive mental health education aims to maintain students' mental health and guide students to view social phenomena from multiple perspectives. Mental health education is based on the laws of students' physical and psychological development, using psychological education methods to cultivate students' good psychological quality and promote the overall improvement of students' overall quality. Mental health education is an important part of quality education: it is an important link in implementing the "21st Century Education Revitalization Action Plan," implementing the "Cross-century Quality Education Project," and cultivating high-quality talents across the century. At the same time, it is also an inevitable requirement of modern education and a common urgent task faced by the majority of school educators to effectively carry out mental health education for students. In the past 20 years, the mental health of students has attracted much attention from

the society. Looking back on the relevant investigation and research on students' mental health, psychological problems have often appeared. Because of the high expectations of the family, the pressure faced by students is significantly higher than that of other groups of the same age, and suicide has become the number one killer of students. In recent years, the psychological problems of students have become more and more serious. In particular, schools generally report that more and more students have problems such as poor adaptability, anxiety, and depression [1]. Mental health will have character defects, emotional defects, psychological defects, and abnormal psychology.

Students will face huge employment pressure when they are approaching graduation. To improve their employment competitiveness, it is necessary to ensure that students have a certain understanding of social development trends and can quickly adapt to the pace of social life. Looking at this issue from the perspective of schools, school administrators need to pay enough attention to mental health education and, through positive mental health education, help students develop a correct world outlook, outlook on life and value orientation, and at the same time carry out a comprehensive

social development. They need to understand and help students successfully complete their identity transition. Mental health education goal is to cultivate good character quality, develop intellectual potential, enhance psychological adaptability, stimulate inner motivation, maintain mental health, and develop good behavior habits, that is, fertility, enlightenment, strength, motivation, health, and guidance. In the specific teaching process, school managers and teachers need to conduct in-depth analysis of various problems exposed in the teaching process of positive mental health education and formulate efficient mental health education teaching strategies based on the actual situation of the school [2].

2. State of the Art

2.1. Educational Goals. The adaptive goal mainly focuses on the students' present, so that students can understand the changing trends and characteristics of the future society, help them establish a long-term and stable outlook on life, values, and world outlook in line with the direction of social progress, and pursue high-level life meaning and guide them through various abilities. To cultivate students to have a correct understanding of the society around them, maintain a harmonious and good adaptive relationship with the society, make college students dare to face the reality and the future, have the courage to practice, have a quick mind, constantly revise those unrealistic fantasies, improve setback tolerance, and be fully psychologically prepared and strong, they must adapt to meet the rapidly changing society. This goal is the main task of current mental health education [3].

The developmental goal mainly focuses on the future of students. It is to take all students as the object of mental health education. It is aimed at students at different stages, at all levels, in various disciplines, and in special groups. For example, new students face weak social skills and appear interpersonal. The relationship is tense and the learning ability is weak, which causes learning difficulties. The lack of self-care ability in life results in overdependence and lack of self-awareness ability, so they cannot treat themselves correctly. Graduates face employment choice problems, interpersonal communication problems, emotional problems, and other "developmental" problems. Through developmental psychological education, students can obtain optimal and most effective development on the basis of adaptation, cultivate innovative consciousness, and enhance students' self-psychological education ability to solve various developmental problems faced by college students in their development [4]. This goal is the focus of mental health education in colleges and universities and represents the main direction of mental health education in the future. In short, in the implementation of mental health education, we should pay attention to all students as the service object and combine the three goals of mental health education to make mental health education play its due role. At the same time, with the deepening of the understanding of mental health education and the summary of practical experience, more and more people realize the importance of mental health education in colleges and universities to the growth and

development of every student. The future development trend of mental health education will be towards development and growth, prevention, and treatment supplemented by the direction of development.

2.2. The Internal Principle of Mental Health Education to Improve Students' Social Adaptability. Students are in the final stage of formation of outlook on life and value orientation. At this stage, positive mental health education for students can guide students to form correct values, have a sound personality, quickly adjust their mentality after entering the society, and successfully complete identity conversion [5]. In addition, in order to improve their employment competitiveness, students will focus most of their energy on how to improve their professional skills, and schools and teachers also pay more attention to the level of students' professional ability. Development will have a certain impact, causing students to fall into a state of semiclosed heart, and then gradually lose their social ability. After entering the workplace, they cannot communicate well with colleagues. It is easy to have friction with leaders and colleagues at work, affecting personal development. To solve this problem, it is necessary to carry out positive mental health education for students, improve their social skills and social adaptability, and enable students to better integrate into social life.

There are many factors for judging students' comprehensive ability. In addition to the professional skills that students have mastered, good psychological quality, communication skills, and social experience are also very important factors. Through positive mental health education, students realize that only having good professional knowledge cannot improve their comprehensive competitiveness, but they have to comprehensively improve their abilities based on professional skills. Especially for some students with poor foundation, they can explore their strengths through positive mental health education, correct their attitude, and correctly examine their own advantages, so as to make up for their deficiencies in professional knowledge and ability and improve their employment competitiveness.

Innovation is an important driving force for social and economic development, and both technological innovation and theoretical innovation can expand a huge space for development. Students are active in thinking and have great potential for innovation. In the process of learning, they can improve their rational thinking ability by accepting scientific and systematic positive mental health education and learn to look at them from different perspectives (personal and social) with materialistic and dialectical thinking. For social development, summarize the law of industry development and flexibly adjust the learning plan and learning goals based on this.

Students who integrate into the society will face enormous pressures from work, life, and other aspects. If they want to keep a clear mind under tremendous pressure, they need to have strong psychological quality and ability to resist pressure. This kind of antistress ability cannot be cultivated

by professional knowledge teaching. It must undergo positive mental health education, so that students can realize the multifaceted nature of social life, maintain an optimistic spirit in the face of pressure and setbacks, and quickly adjust their psychology. Once you find that you cannot carry out effective psychological construction, you should take the initiative to seek the help of a professional psychologist to help yourself get rid of the influence of negative emotions as soon as possible.

2.3. Factors Affecting the Mental Health of College Students. Social factors are the determinants that affect the psychological development of college students. Marxism believes that the essential attribute of man is social. Man is a social man. The process of growth in life is actually a process of socialization. Socialization is the process in which people become qualified members of society with independent personalities through interaction with the social environment under specific social material and cultural conditions [6]. For college students who are in the midst of social change, with the expansion of college enrollment and the reform of the national distribution system, this is a test of their psychological quality and comprehensive quality. Facing the society's requirements for talents, the college students are confused in their hearts, and some of the college students who do not adapt well to the society have psychological obstacles such as anxiety and depression. At the same time, the negative effects brought about by social changes, such as corruption, unhealthy ideology, and poor social facilities, will make college students unable to face and eliminate the limitations of their own knowledge, experience, and self-cultivation troubled. In addition, due to the popularization of the Internet and the wide and rapid dissemination of information, college students, as the most active, sensitive, and knowledgeable people in the society, often feel the changes and shocks first. Generally speaking, the psychological development level of the period is becoming mature but not really mature, so it is inevitable to feel confused, empty, depressed, and at a loss in the face of such changes and shocks. The main source of stress for contemporary college students is study and work, and they are under a lot of pressure at work, as shown in Figure 1.

College students spend most of their lives at school. The growth and development of college students are inseparable from school education and management. Because of the close relationship between college students and schools, the mental health of college students will inevitably be affected by school factors. At present, the main factors affecting the mental health of college students in college life are psychological discomfort caused by changes in the environment and roles; simple teaching methods cannot meet the requirements of students' study and life, which is one-sided implementation of educational ideas [7]. The emphasis on grades, ignoring ability and intellectual factors, ignoring nonintelligence factors, lack of a good interpersonal environment for college students to communicate properly with classmates and teachers, and the influence of unhealthy

campus culture all have a certain impact on the development of students' mental health.

The family is the cell of society and the first social environment a person comes into contact with. Although college students are far away from their parents, the ups and downs of the family will affect the mood of college students because of the blood relationship, economic connection, and emotional maintenance. Especially in most one-child families, due to the overindulgence of their parents, they must first cultivate their self-care ability and learn to get along with others harmoniously after entering university. If these problems are not solved well, it is easy to induce psychological problems. Also from an economic point of view, poor college students with low family economic level are psychologically prone to have low self-esteem and lack of confidence [8, 9]. Poor family relationships or unsound family structures often make it difficult for college students to communicate with their families normally in emotional and other aspects and cannot meet the normal sense of belonging and love needs of college students, resulting in great psychological pressure mental disorder.

The mental health of college students is closely related to their psychological quality and psychological endurance. The same life events often have different meanings for different college students and thus have different effects on mental health. Generally speaking, the crisis of identity, the defect of personality, the incompleteness of psychological quality, and the instability of emotional development will cause different college students to adopt different attitudes towards the same thing and thus have different effects on their mental health. In the face of success and failure, how to actively control the self and adjust the self has become an important factor in preventing depression and interpersonal relationships; college students' understanding and acceptance of the physiological self and physiological diseases will affect their mental health [10]. At present, with the increase of stress and pressure brought about by the increase of stressful stimuli in the whole society, the psychological quality of college students cannot keep up with the requirements of the times fail. Once the environment becomes different from the previous one, there will be a sense of frustration; especially when the relative intensity of the setback is greater or the duration is longer, it will turn to disappointment and low self-esteem and they will become discouraged and lethargic.

3. The Current Mental Health Situation of Students

According to the survey data in 2020, we can see the depression tendency of current college and undergraduate students, as well as the depression status of adults in the country, as shown in Table 1.

A comprehensive analysis of the student group shows that 76.3% of the current students are in a mentally subhealthy state, only 10.3% of the students are in a normal state of mind, and 16.3% of the students have different degrees of psychological problems. It is very necessary, and the specific data is shown in Figure 2.
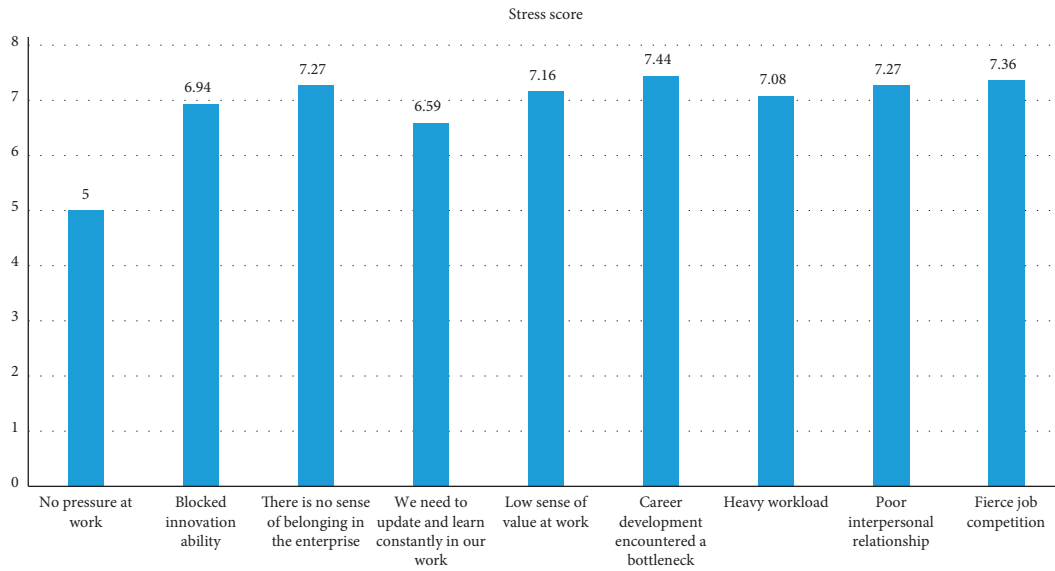
Figure 1: Students' work stress cognitive score.

Table 1: Statistical table of depression tendency.

Object of investigation	No tendency to depression (0–9 points)	Have a tendency to be depressed (10–16 points)	High risk of depression (17–27 points)
Undergraduate boys	72.6	20.8	6.6
Undergraduate girls	70.0	22.4	7.6
College boys	90.2	8.2	1.6
College girls	89.3	8.8	1.9
National adults (reference)	78.8	16.7	4.5

Figure 2: Students' mental health status.

The specific relationship between their mental health states is shown in Figure 3. The main manifestations of their psychological problems are anxiety, hostility, paranoia, depression, etc., as shown in Figure 4.

Regarding the statistical analysis of the obtained data according to gender classification, comparing the differences between men and women, we can see that there is a certain gap in the mental health status of different genders. Women's mental health index is higher, and men are slightly more depressed than women. For details, see Figure 5.

The survey found that the current sources of psychological problems mainly include emotions, parent-child relationship, peer relationship, learning, and many other aspects, among which the repressed emotions from learning are an important factor for the student group, and the current learning pressure leads to a certain degree of psychological problems in students; the specific data is shown in Figure 5.

4. Mental Health Education Methods

Mental health education is different from ideological and political education, the necessity of its existence is self-evident, and it is also different from ideological and political education in the process of education and teaching; see Table 2.

4.1. Enrich Teaching Content. Enriching teaching content aiming at the single problem of mental health education content in colleges and universities, school administrators, and teachers should try to update and enrich the teaching content [11]. On the one hand, it is necessary to flexibly adjust the teaching structure, and add some new elements according to the social development trend, such as "comparative research on different ideas in the context of economic globalization" or "be alert to the influence of "color revolution" on young people's thinking," so as to make mental health better. The educational content is more in line with the reality [12]. On the other hand, when teachers carry out teaching design work, they need to update the cases in the teaching plan, select some cases that are closely related to students, and make
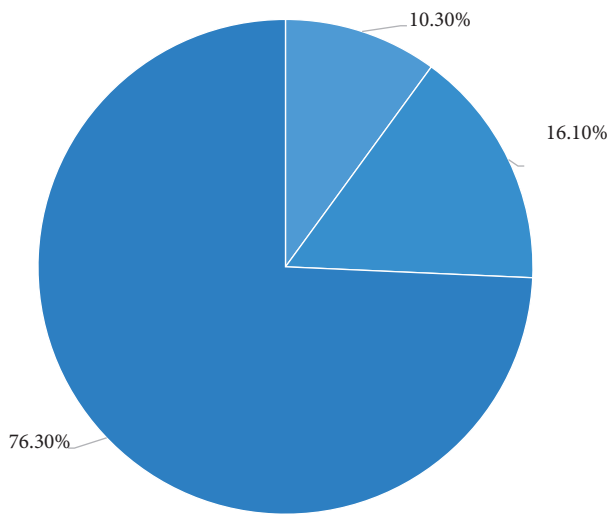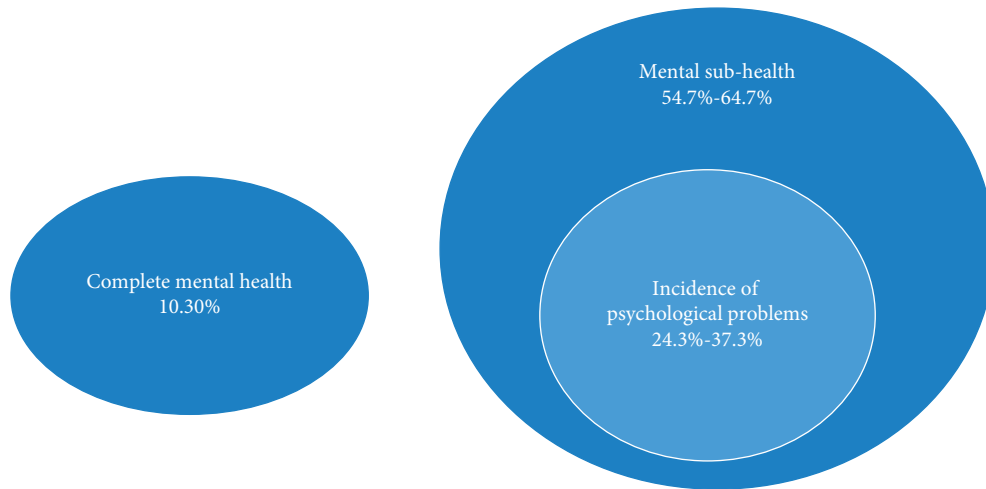
FIGURE 3: The specific relationship between students' mental health states.
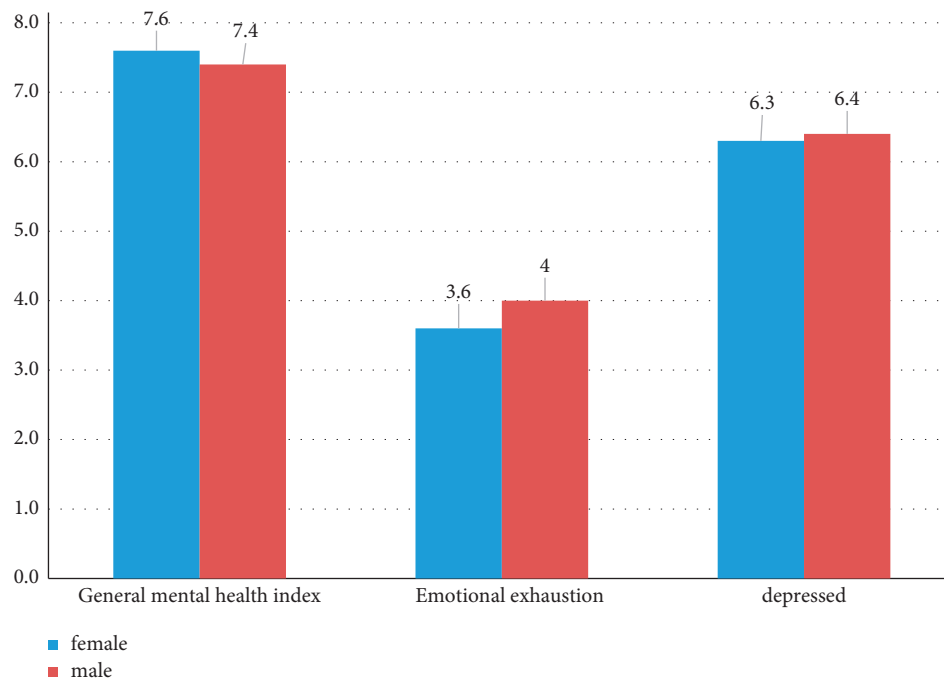
FIGURE 4: The specific state of students' mental health.
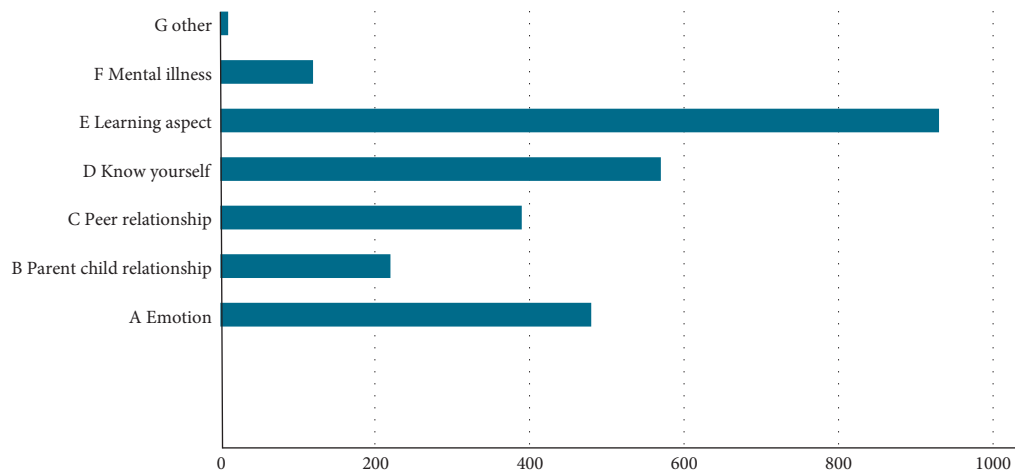
FIGURE 5: Sources of students' mental health problems.

TABLE 2: Ideological and political education and mental health education.

Subject different points	Ideological and political education	Mental health education
Theoretical basis	Marxism–leninism, lao ledong thought, leng xiaoping theory, and the important thought of "three represents"	Various theories of mental health and counseling and therapy
Purpose	Solve the problems of students' marxist positions, viewpoints, and other political views and high-level social orientation	Optimize psychological quality, develop psychological potential, improve mental health, prevent and cure psychological diseases, cultivate students' sound personality, good personality, improve social adaptability, promote all-round development
Content	Through the education of world outlook, outlook on life, values and patriotism, collectivism, socialist theme education, moral education, situation policy and basic line education to provide spiritual motivation, intellectual support, talent and political guarantee for the socialist cause	Publicize and popularize the knowledge of mental health, introduce the ways to improve mental health, impart the methods of mental health, and analyze the abnormal psychological phenomena
Working principle	Open principle and value-oriented principle	Confidentiality principle and "value neutrality" position
The subject of teaching: role positioning	Teachers are mainly indoctrinated education, and teachers and students are the relationship between education and the educated	Teachers and students often appear in an equal and cooperative relationship, teachers play a catalytic role in the role of supporters and supporters
Evaluation criteria	Measured by the completion of the task and the cohesion of the class, whether the students can be trained as "four have" newcomers and adhere to the right political direction	Whether the negative emotions of the educated have been alleviated, whether the psychological obstacles have been gradually eliminated, whether the mental diseases have been alleviated and cured, whether the ability to adapt to the environment has been enhanced, and so on

students aware of the important role of mental health education. The current basic process of psychological education activity courses is as shown in Figure 6.

There are certain differences in students' satisfaction with the current mental health education, and there is a certain understanding of the current education and teaching methods. The specific satisfaction is shown in Figure 7.

4.2. Clarify the Teaching Object. Positive mental health teaching is a systematic educational discipline. The goal of learning is not only to help students overcome psychological problems, but also to focus on how to improve students' psychological potential and help students build a sound personality and a strong heart. Only in this way can students calmly cope with various challenges and pressures in social work [13]. In this context, teachers should clarify the objects of mental health teaching and expand the scope of teaching, not only to carry out mental health education for students with psychological problems, but also to carry out positive mental health education for ordinary students. Treat students equally, do not evade various psychological problems raised by students, understand the real psychological state of each student through active communication, and formulate different education plans to improve teaching efficiency. In addition, in order to improve teaching efficiency, teachers should make full use of various resources, use information technology to form a complete communication system among students, schools, teachers, parents, and social enterprises, and give full play to the advantages of various resources so that students can selectively receive positive

mental health education to improve their psychological quality and social adaptability.

4.3. Carry Out Teaching Practice. In view of the disconnection between theoretical teaching and social practice, teachers and school administrators need to actively expand teaching practice. While carrying out theoretical teaching, students have the opportunity to apply theoretical knowledge in practice. If there is a lack of practical activities, the positive psychological knowledge learned by students will not be able to play its role, nor will it achieve the goal of improving students' social adaptability. It should be noted here that the practical activities related to mental health knowledge are not unique. In short, it is not possible to set up a practical course for mental health teaching. Let the students summarize the experience in the practice process of the professional course, then analyze the students' summary from the perspective of positive psychological education, and point out which problems in the practice process are caused by the lack of positive and healthy psychology. In this way, students can be aware of the important role of positive psychological education [14–17].

4.4. Special Education Activities for Career Selection. Bandura's ternary interaction theory considers people's psychological activities and environmental performance from the interactive relationship between the environment, individuals, and their behaviors and regards people's psychological activities as the interaction between the environment, individuals, and their behaviors. There is two-way influence of social environment and people's internal
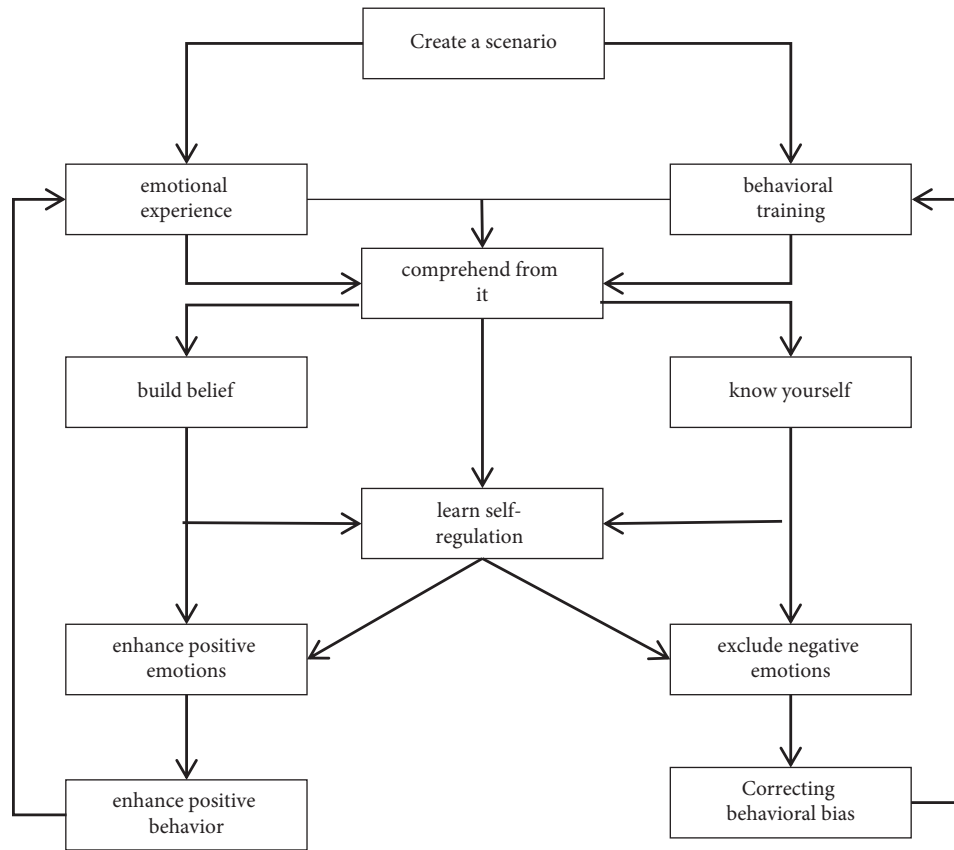
Figure 6: Comparison of public ecological and environmental behaviors in my country.
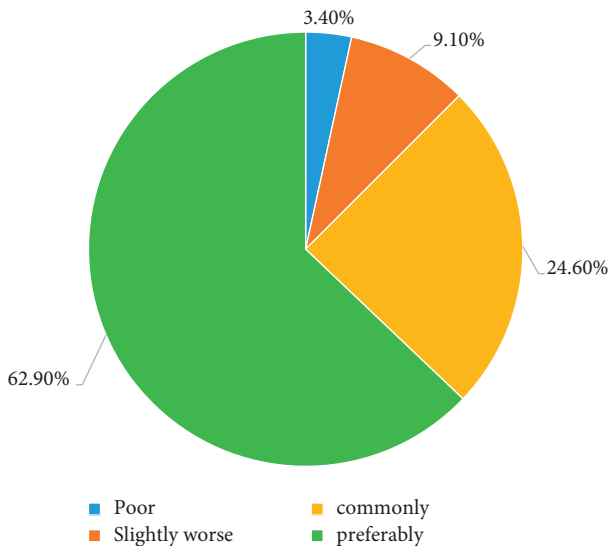
Figure 7: Students' satisfaction with mental health education.

psychological impact and behavioral constraints on students' psychological feelings, psychological experience, psychological development, and even their learning, life, communication, and growth [18]. In accordance with the spirit of the relevant documents of the Ministry of Education, and in accordance with the requirements of the local education authorities and human resources and social security departments, organize students to carry out a series of special competitions to improve their psychological quality and vocational skills, such as career planning and design competitions, entrepreneurship design competitions, and vocational skills and competitions; invite human resources market managers, elites of enterprises and institutions, outstanding graduate representatives, etc. to come to the school to give career guidance lectures; invite experienced psychological consultants, psychotherapists, and career instructors on campus and outside the school to conduct career selection psychology for students tutoring, etc. [19]. These distinctive, focused, and colorful career choice special education activities can help students understand social dynamics, employment situation, and career characteristics, so as to clarify learning goals, generate learning motivation, adjust career selection mentality, and establish correct career values. Lay a good foundation for a successful career in the future. Alleviate the employment pressure brought by the pressure on students, and ensure that graduates have a mentality to smoothly adapt to the society and enter the society through the holding of various activities and mental

psychological factors. As the unique environmental education force of the school, campus activities are the potential courses for students' growth. The role of a good and strong campus cultural atmosphere and diverse and effective campus activities in school education is immeasurable and cannot be replaced by any explicit curriculum and rules and regulations. As an environmental education force, it has a

health activities. Social practice activities not only give students the opportunity to directly contact the society and enhance their cognition of social life, but also make them better understand all aspects involved in professional life, realize their own shortcomings in the future professional field, and then can better arrange the study and life in school. At the same time, these social practice activities are of great benefit for students to better master the skills they have learned, apply the theories they have learned to work practice, and improve their sense of efficacy in career selection.

4.5. Suggestions for Strengthening Mental Health Education

4.5.1. Distinguish Different Types of Psychological Counseling Projects. Individual consultation mainly includes consultation room consultation, telephone consultation, and letter consultation. Consultation in the consultation room means that students come to the consultation room for consultation once or twice a week to solve the confusion and psychological problems in study and life. The consultation room should have a standardized consultation appointment card and consultation record book when consulting and archive it in time after the consultation. When making a consultation appointment, students should first fill in basic information, such as name, gender, age, class, contact information, emergency contact information, and suitable time for consultation. The consultation record manual generally includes consultation instructions, detailed information of visiting students, consultation process records, and consultation conclusion summary. The consultation instructions mainly include the introduction of the consultation room, the rights and obligations of psychological counselors, the rights and obligations of visiting students, the principle of confidentiality, and the right of the consultant to interrupt the consultation. Counseling students should sign their names to agree to counseling after reading these. The record of the consultation process should include the date, brief introduction to the consultation content, and consultation plan. The summary filled out by the psychological counselor at the end of the consultation should include the reasons for the end of the consultation and the effect of the consultation. Filling out the consultation record booklet will help psychological counselors to accurately grasp the mental health status of students, as well as future reference and case studies. The consultation-visit relationship formed by telephone consultation and letter consultation is relatively special. The psychological counselor can only talk to the consultation students by telephone or letter and cannot directly observe other aspects such as the body language of the consultation students. Therefore, special attention should be paid to the content and time of the conversation for the sake of control and other issues and to try to avoid the problem of telephone or letter harassment. The counseling room should arrange a psychological teacher on duty every day and publish the brief introduction, duty time, and consulting telephone number of the counseling teacher on the campus network and the consulting window [20].

Generally speaking, for developmental counseling and preventive counseling due to career choice, either room counseling, telephone counseling, or letter counseling can be used, but if psychological barriers to career choice have occurred, counseling room counseling should be used.

4.5.2. Seize Different Time Periods for Business Management Consulting Services. Although students study in school for a short period of time, their psychological conditions are different in different periods, and their psychological characteristics have obvious stages. Therefore, grasping the different periods of students' psychological development to provide counseling services can play a multiplier effect with half the effort.

The census of freshmen's mental health status has become a must-have in the education of freshmen in various colleges and universities in recent years. Advantages: discover your potential, and find a career path suitable for your own development. During the census of the mental health of freshmen, you should guide students to take relevant career assessments, such as professional personality assessment and Hollander vocational interest assessment. Conditional schools should purchase relevant software to guide students in online assessment, and psychological counselors will also give scientific and reasonable psychological assessment explanations and guidance. Soon after the freshmen enter the school, the school should carry out career education for the freshmen, introducing the development status of the major they are studying, the occupational fields involved, the employment status of the previous students, the subjects to be studied in this major, and the knowledge and skills to be mastered. Wait. It should be combined with career assessment and career education to guide freshmen to establish career goals and carry out career planning [21].

4.5.3. Carrying Out a Number of Activities of Psychological Education Consulting Services for Career Selection. Psychological counseling service agencies for career selection should take the initiative to interview students who have psychological confusion and psychological barriers in career selection based on the problems reflected in the students' psychological files, and provide psychological counseling through meticulous consulting services. At the same time, for students who take the initiative to come to the door for consultation, they should help them in a scientific and orderly manner according to the consultation procedures and methods. For the relevant activities carried out by the school, actively cooperate with and give professional guidance. For the freshman and sophomore groups of students with different majors and different psychological characteristics, the relevant knowledge of career choice and career development will be popularized in different ways, and the occupational psychological quality will be expanded through group training. Compared with nongraduating students, graduating students are a high-risk group of psychological problems when choosing careers. Psychological education counseling service agencies for career selection should work with relevant departments, such as the Employment

Guidance Center, to do a good job in the investigation of graduate students' career selection psychology and career selection psychological education, actively carry out consulting services for the problems found in the investigation, and conduct job interviews for students. Psychological counseling refers to teaching students the methods of psychological adjustment when they are frustrated when choosing a career. For students who have had a psychological crisis, the psychological counseling teacher should cooperate with relevant school personnel to rush to the accident site to start work as soon as possible, understand the situation, use professional knowledge to persuade students in psychological crisis in a timely manner, and do a good job of psychological crisis students and surrounding students. Psychological relief work [22]: when the crisis is initially resolved, the guardian should be assisted in further counseling and comforting work, judge whether to refer to a professional institution for treatment based on the actual situation, and cooperate with monitoring and referral. Conditional colleges and universities can set up a psychiatric outpatient clinic in the school hospital or hire a professional psychiatrist to visit the school hospital on a regular basis, which is more conducive to early detection of psychological crisis problems and timely resolution of problems.

5. Conclusion

Students' mental health has always been a hot topic in colleges and universities. How to make students integrate into the collective and society faster and better is also one of the most difficult problems for educators. Students want to improve their competitiveness; not only must they have superb professional skills, but they also must have good social adaptability. Only in this way can you quickly complete your identity change and quickly adapt to workplace life. Students' social adaptability is not innate, but gradually formed through long-term positive mental health education. Under this background, it is necessary to formulate a targeted positive mental health education plan according to the actual situation of the students, so as to comprehensively improve the comprehensive quality of students in this way. According to other researches on college students' mental health and social adaptability, they also start with college students' social adaptability to analyze the current situation of college students' social adaptability and mental health. Correlation analysis was carried out on the mental health of college students in four dimensions, and then the prediction degree of social adaptability to mental health was analyzed.

Students' social adaptability has increased. In addition to improving their national society and workplace work, it also plays a role in the conservation of the natural environment. And explore this one theme; just accord with how this special issue wants to explore creativity in environment management.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Hindawi

Retraction

Retracted: Analysis of O2O Teaching Assistant Mode of College English in MOOC Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] Y. Zhang, "Analysis of O2O Teaching Assistant Mode of College English in MOOC Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 8164934, 11 pages, 2022.

Hindawi

Research Article

Analysis of O2O Teaching Assistant Mode of College English in MOOC Environment

Yan Zhang ⬤

Huanghe Jiaotong University, Wuzhi, Jiaozuo 454950, China

Correspondence should be addressed to Yan Zhang; 2004070272@zjtu.edu.cn

In the past, teaching assistants always focused on the physical environment and actions, resulting in a lot of carbon emissions and material waste. This paper discusses the online and offline integration of college English teaching assistance model, which helps inspire the significance of saving energy and reduce carbon emissions in higher education environment. Our country has been putting education informationization in a very important position. In recent years, the demand of college education informatization is more urgent, which calls for the reform of college classroom teaching mode. "O2O teaching mode" is a teaching mode that integrates online and offline teaching, uses computer information network technology, makes use of network media, and relies on online MOOC platform to carry out online network learning and offline face-to-face classroom learning. "O2O teaching mode" has the characteristics of openness, interactivity, individuality, convenience, and generation, which is conducive to changing students' learning mode and teachers' teaching mode, realizing resource sharing, and improving teaching quality. English is a practical course. In the practice of modern English teaching, it is necessary to maintain and develop the advantages of traditional humanistic teaching, and to make efficient use of the media resources and network resources under the condition of modern educational technology, so as to ensure that English learners have active and sufficient practice opportunities. With the popularity of the Internet and the development of MOOC, more and more English learners begin to learn independently online. English online learning platform has become an indispensable tool for independent learning and daily English teaching. Especially when the Internet is connected with the campus network, the role of the network has changed from teaching auxiliary resources to teaching platform, making online learning become a new way of learning, realizing the interaction of English teaching in the network environment.

1. Introduction

The development of the times has forced continuous innovation in education, and the advantages of the "Internet plus" teaching model have been fully reflected in the impact of the epidemic [1]. I believe you are no longer unfamiliar with such new words as "opposite classroom," "Internet +," "MOOC," and "O2O." In order to keep up with the times and the pace of education reform, and to better improve the teaching effect, the author tries to integrate O2O teaching mode into the teaching mode of opposite classroom, in order to achieve the ideal teaching state. Pioneered by Professor Zhang Xuexin, the idea is based on the theories of psychology and educational psychology, in which classes are roughly divided in two, with half of class time allocated to

teachers and the other half to students for discussion. At the same time, teachers' teaching time and students' discussion time are separated, so that students can arrange their own learning after class and carry out personalized internalization and absorption. It is worth noting that the discussion in the split mode is in the second class. From the perspective of time schedule, it means that the content taught in the last class is discussed in this class. The purpose of "classroom discussion" is to improve the quality of discussion, and only when students are fully prepared can they discuss actively, have something to say, and enhance their enthusiasm and initiative in learning [2]. The Online to Offline (O2O) teaching model based on Massive Open Online Resources (MOOC) can make students better "prepared" for English teaching and enable the effective implementation of separate

classes. In order to deal with the special situation of the epidemic, various teaching platforms poured out during this period, providing students with more excellent teaching courseware, micro video, open class, demonstration class video, and online live broadcast of all kinds of famous teachers' classes. Undoubtedly, this has brought more convenience to education and enriched the learning content of students [3]. The O2O teaching model is a new education model proposed by Qingda learning bar by referring to some experience in the business field and closely connecting with the actual needs of students and parents [4]. The application of this model in auxiliary classroom can make reasonable use of excellent educational resources and improve the effectiveness of learning.

Constructivism theory holds that learners do not passively receive external information but actively select and process it. They do not complete the same processing activities under the unified guidance of teachers, but with the assistance of teachers and others, they construct their meanings to the real world through unique information processing activities [5]. According to the Basic Requirements of English Teaching for Higher Vocational Education by the Ministry of Education, vigorously introducing and applying all kinds of advanced teaching methods can cultivate students' interest and enthusiasm in English learning, so as to strengthen students' ability to consciously learn English. O2O MOOC points the classroom environment, and the theoretical basis of the auxiliary teaching mode mainly follows the built socialism theory, by adopting the combination of online teaching way to a full range of English learning and, at the same time, giving full play to the guidance of teachers in the classroom, guiding and helping learners fully participate in the whole learning process and the initiative to build knowledge learning [6].

MOOC is a large-scale web development course, which is characterized by diversification, wide audience, and easy operation. The English MOOC teaching system can check the teaching tasks and analyze the overall teaching effect by virtue of online technology and background data statistical analysis. Under the MOOC environment, the O2O teaching assistant mode of English teaching in higher vocational colleges makes use of MOOC network resources to enable students to further consolidate and learn the content taught by teachers and then internalize it into their own, so as to be well prepared to participate in the discussion. Therefore, in a sense, the divided class is essentially to introduce an internalized link of psychology between teaching and discussion and realize the unity of opposites between "teaching method" and "learning method" through the organic integration of teaching and discussion [7]. O2O MOOC environment auxiliary teaching mode in effective internalization of this link can be twice the result with half the effort, and it can integrate students' learning knowledge of English, and refining and summarizing, with corresponding strategies, help students' learning ability play itself to the best condition and, at the same time, stimulate students' learning enthusiasm and set up the higher consciousness of autonomous learning.

Firstly, under the guidance of constructivism and based on MOOC, this paper builds an O2O teaching platform for non-English majors in higher vocational colleges, focusing on the construction of learning database.

Secondly, combined with the O2O teaching platform and flipped classroom model, the O2O teaching model of Vocational English is constructed, and the feasibility and effectiveness of the model are verified. The platform from the angle of the users is divided into learners, teachers, and teacher three roles, giving priority to the learning and learners' online autonomous learning function, and according to the function of the system, thr partition could be divided into independent learning platform system, resource management system, teaching management system, evaluation feedback system, certification system, etc. All the self-learning content in the platform is embodied in the form of tasks to improve the enthusiasm of learners for self-learning.

Finally, this paper applies O2O teaching model to conduct teaching experiment research. This study took students from two classes of foreign-related nursing major in a vocational and technical college in Fujian as the experimental objects and compared the teaching effects of O2O teaching mode based on MOOC and 3P teaching mode in vocational English through experiments. The experimental results show that there is a significant difference between the scores of the experimental class and the control class, which proves that the O2O teaching mode of higher vocational English has certain effectiveness and feasibility. If the mode is properly used in English teaching, it will help strengthen the enthusiasm of higher vocational students to learn and improve their practical English application ability.

On the one hand, the research of this paper enriches the theory of English teaching and has theoretical significance. On the other hand, it can also provide reference for practical teaching and has practical significance.

2. State of the Art

In the past two decades, the cognitive learning theory that advocates students as the subject of information processing has replaced the behaviorist learning theory that regards students as the object of knowledge indoctrination. In recent years, psychologists continue to carry out in-depth research on the cognitive law of human learning process, which makes constructivism learning theory, an important branch of cognitive learning theory, become gradually popular in the educational circle. "Although it is impossible to complete the establishment of constructivist theoretical system in the short term, its core ideas and basic principles have been established, which can provide practical guidance for the teaching design of constructivist learning environment based on Internet and multimedia technology." Its guiding principles are as follows:

Being student-centered is not only the basic idea and starting point of online autonomous learning, but also the core content of online autonomous learning teaching theory and learning theory [8]. "Initiative, externalization of

knowledge, and self-feedback are the three basic elements to achieve student-centered development."

The learning context must be conducive to the meaning construction of the essence of the learning content (that is, the understanding of the learning content) and can complete the meaning construction of new knowledge through "assimilation" and "adaptation." Therefore, teaching design should not only analyze teaching objectives, but also take situation creation as one of the main contents of teaching design, which is beneficial to learners to construct meaning. However, in the traditional classroom mode, it will be difficult for learners to construct the meaning of knowledge because learners cannot be provided with vivid and practical situations.

"Collaborative learning, whether between teachers and students or between students and students, plays an important role in the collection and analysis of learning materials, the proposal and verification of teaching hypotheses, the evaluation of learning outcomes, and the ultimate construction of meaning" [9].

Teaching design under the guidance of constructivism is not the design of teaching environment, but the design of learning environment. The interaction between learner and learning environment plays a key role in the construction of knowledge meaning. Learning environment refers to the place where learners study independently and explore freely. In this environment, learners can use various information resources and learning tools (such as books, text materials, audio-visual materials, network information, CAI, and multimedia courseware) to achieve their learning goals. Learning should be supported and facilitated, not strictly controlled. The learning environment is a place that supports and promotes autonomous learning.

"In order to promote learners to actively explore and achieve meaning construction, learners must be provided with various types of information resources, including various teaching materials and teaching media; however, these materials and media are not used to support teachers' lecture and demonstration, but to assist learners' autonomous learning and collaborative exploration." In the process of learners' active exploration, teachers are in urgent need to provide guidance and help on the acquisition methods, acquisition approaches, and effective processing and utilization of all kinds of information resources [10].

Constructivism theory holds that "the meaning to be constructed refers to the law and nature of things and the internal connection between things." The learning process of helping learners to achieve meaning construction is to help learners to have a deep understanding of the laws, nature, and internal relationships of things contained in the current learning content [11]. In constructivism learning environment, learners are emphasized as cognitive subjects and active constructors of meaning, so the realization of meaning construction of knowledge by learners is the ultimate goal of the whole learning process, and the whole teaching design must be subordinate to the center of "meaning construction."

Whether we can get rid of the shackles of traditional teaching mode is the key point of deepening teaching reform at home and abroad [12]. This traditional teacher-led teaching mode suppresses the initiative of students as cognitive subjects and is difficult to undertake the responsibility of cultivating high-quality talents with practical ability and innovative spirit. In order to achieve the goal of teaching reform, experts and scholars at home and abroad have carried out a great deal of in-depth exploration and research from both theoretical and practical levels over the years, and constructivism theory is one of the important achievements. With the wide application of Internet and multimedia technology in the field of education, the influence of constructivism theory is expanding day by day all over the world. However, it is still worth thinking how to apply the theory into the demonstration teaching and how to use the demonstration to prove its feasibility, which is discussed in this paper.

3. Methodology

3.1. Research on Online Autonomous Learning System.
There have been a lot of in-depth studies on online autonomous learning at home and abroad. Tables 1 and 2 are statistics of research papers and websites or web pages related to online autonomous learning found by keywords in the three global search engines and CNKI respectively.

Since the 1950s, many disadvantages of the traditional education model have led to the stagnation of the study of educational methods. Some educational experts have gradually shifted their research focus from the study of educational objectives, educational methods, and educational content to the study of learning methods for learners, resulting in many learning theories [13]. Since the 1970s, many schools of psychology have studied autonomous learning from different perspectives, and learners have been attached great importance. The theory and practice of autonomous learning have become a hot issue in educational research and educational psychology. Psychologists led by Zimmerman B. J. put forward a set of influential autonomous learning theory in the 1990s. Zimmerman B. J. explained the essence of autonomous learning from six aspects of learning motivation, method, behavior, time, social environment, and material environment. In terms of educational practice, scholars have also carried out practical research on teaching modes that promote students' autonomous learning ability, for example, "Manning's cognitive self-guidance model, Johnson's cooperative learning model, Machenbaum's speech self-guidance training program, and the educational reform of Okawa Gakuen in Japan under the guidance of Kohara's Whole Person Education Theory."

At the same time, the rapid development of online education in foreign countries also drives the research on online autonomous learning system and the development of online autonomous learning. The main performance is as follows:

Lindenlaub John in the article "A Hybrid Lecture/Self-study System for Large Engineering Classes" mainly expounds the study of the learning environment in the autonomous learning System and also studies the autonomous

TABLE 1: The number of relevant web pages searched by the three major search engines.

Search engine	Keyword		
	Online self-directed learning	e-learning	MOOC
Google	1,110,000	187,000,000	9,210,000
Yahoo	1,120,000	49,990,000	1,460,000
Baidu	7,700,000	7,440,000	967,000

TABLE 2: The number of related papers searched by CNKI.

Dissertation database	Keyword		
	Online self-directed learning	e-learning	MOOC
Full-text database of Chinese periodicals	40,947	9,771	1,549
The full text of China's outstanding doctoral and master's degree thesis	10,268	3,387	82

learning methods and characteristics of autonomous learning. By comparing the traditional course arrangement and materials with those in the independent learning system, Lindenlaub John pointed out that the independent learning environment has a certain influence on the independent learning method, and the learning method in the independent learning system is more flexible than the traditional learning method [14].

Wilder in an Individual self-study System in A Numerical Mathematics Course Based on Educational "Software" describes an independent learning system designed for sophomore engineering courses. The author analyzes the impact of the independent learning system on learners' learning from three aspects: the development of independent learning materials, the change of evaluation methods, and the development of learning tools. Due to the influence of these three aspects, learners' online independent learning is more planned and regular compared with offline independent learning.

3.2. O2O Teaching Model Introduction.
There are various versions of the connotation of "O2O teaching mode." Based on the views of other scholars, the author summarizes the connotation of "O2O teaching mode" as follows: O2O teaching mode mainly refers to the use of computer information network technology, with the help of network media. Relying on online MOOC platforms (such as Good University Online and UOOC Alliance), the teaching mode is highly combined with online network learning and offline face-to-face classroom learning. This hybrid teaching model allows students to achieve personalized learning goals through online learning while attending in-person on-campus classes. The schematic diagram is as follows in Figure 1:

3.2.1. Characteristics of Learning under O2O Teaching Mode.
A typical O2O teaching mode is shown in Figure 2. The characteristics of this mode of learning are as follows: online MOOCs videos explain basic knowledge of the course and use network media to carry out video, voice, forum Q&A, and other forms of interaction. Passing the pass requires students to complete online coursework, exams, etc. Offline,

teachers of each course group will carry out special teaching based on textbooks and students' majors, guide students to carry out small-class discussions after class online, and organize students to participate in relevant social practice activities.

3.2.2. Characteristics of Assessment under O2O Teaching Mode.
Figure 3 shows the activity flow of a typical O2O teaching model. Online examination is mainly composed of teachers and teaching assistants to complete, but the characteristics of "peer mutual links, namely, between learners and learners, can also be mutual comparison, all students who complete online learning tasks, such as watching video, complete online assignments, and all kinds of test, participate in the BBS and mutual teaching, etc., and through online and offline test with qualified score, and confirmed by the curriculum group, students who meet the credit requirements of the school will be recognized as course credits by the school according to its regulations.

Hybrid learning mode is the general trend of the future development of higher education in China, and it is an important support for teaching and learning to improve students' personal ability. It is not just a simple use of advanced network technology as a teaching aid tool, but also integrates itself into the main part of teaching. The assessment method of O2O teaching mode is that those whose total score of online evaluation system evaluation and peer mutual evaluation exceeds the passing score can be granted half of the credits of the course, and those whose total score of offline final assessment and practice report exceeds the passing score can be granted the other half of the credits of the course. Full credits will be awarded to students who have completed both online and offline tests [15]. Based on this, the two constitute an organic and complete teaching process. The Christensen Institute cited graded change and blended learning as examples. A key factor in most definitions of blended learning is that students must learn to control their time and develop their ability to choose a path or rate of learning. With the advent of the era of the Internet + mobile Internet, mobile client education APP classes will give the future of the application of the hybrid education mode to add more support to students' fragmentation and online

Figure 1: Two cycle modes of MOOC.

Figure 2: Higher vocational English O2O teaching platform.

leading MOOCs providers in the US are Coursera, edX, and Udacity. About 20 schools in the UK have started offering free online courses using the Future Learn platform. MOOC providers have also sprung up in other countries, such as Iversity in Germany, School in Japan, Veduca in Brazil, and more. MOOCs in the United States have partnered with universities in Australia, China, Switzerland, and other countries. The interactive relationship between online activities and offline activities is shown in Figure 4.

3.3.2. Domestic Research and Exploration of MOOC. At present, the construction of MOOC in China is in the initial and exploratory stage [16]. The year 2013 is known as "the first year of Chinese MOOC." MOOC development in China and the world is almost synchronous. The new era of education represented by MOOC has come. EdX, one of the so-called "MOOC troika," announced the addition of online courses at 15 universities, including six Asian universities including Peking University and Tsinghua University. In July 2013, Fudan University and Shanghai Jiaotong University signed contracts with Coursera. In a short period of time, the frequent interaction between Chinese famous universities and MOOC companies proves that MOOC, a new education model, has brought a huge impact on China's higher education. With the cooperation, MOOC platforms in the United States will offer courses from Chinese universities for the first time. According to the agreement, Coursera must subtitle a course within seven working days if 10,000 people have signed up for it. Fudan University, Shanghai Jiaotong University, and other universities will offer online courses to the world, building the world's largest online course network together with Harvard, MIT, and Stanford. About 130,000 Chinese users registered on Coursera in 2013, ranking ninth in the world, according to the company. In 2014, the figure was 650,000, a far larger increase than in any other country.

Meanwhile, Chinese universities are building their own MOOC platforms. Led by Shanghai Jiaotong University, C9 universities such as Peking University, Tsinghua University, Zhejiang University, Fudan University, NTU, Xi'an Jiaotong University, Harbin Institute of Technology, and China University of Science and Technology, as well as Tongji University, Dalian University of Technology, and Dalian

learning time and support their personalized learning habits, and the system will default to support learners learning rhythm to remind the time to study at ordinary times, or the complete practice work. At the same time, this powerful function is also applicable to teachers.

3.3. Current Situation and Analysis of MOOC Research

3.3.1. Foreign Research and Application of MOOC. MOOC originated in the United States in the late 1990s. In 2008, the Canadian academics Bryan Alexander and Dave Cormier jointly coined the term "MOOC." This massive MOOCs took higher education by storm in the fall of 2011, heralded as "the biggest innovation in education since the invention of printing" and heralded the "future of education." The New York Times described 2012 as "the first year of MOOCs." As of May 2013, there were about 450 MOOCs around the world, and the number is still growing. The

Figure 3: O2O teaching mode of higher vocational English.
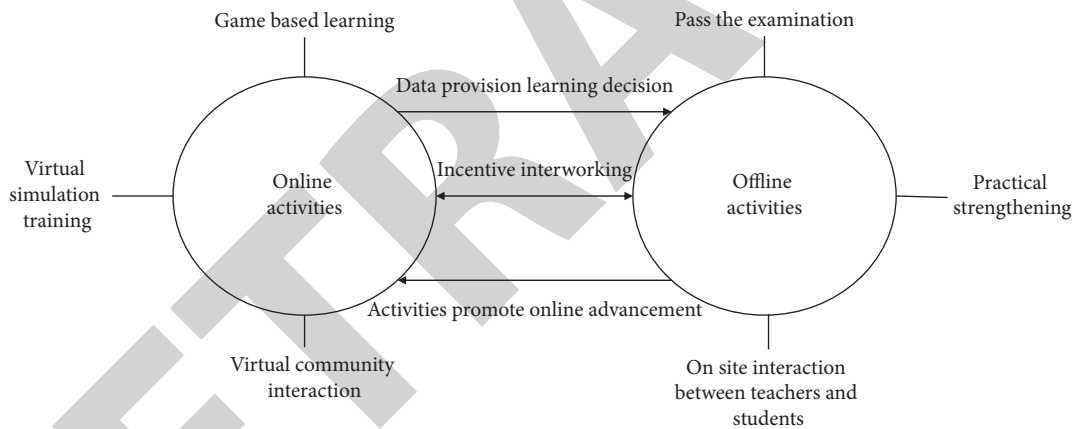
Figure 4: Online and offline teaching.

University of Technology, jointly built the "China MOOC" [17]. The above universities will strengthen cooperation in the curriculum standards and construction of "open online courses," the construction of sharing platform and sharing mechanism, and jointly explore the training mode of cross-school joint minor based on MOOC. The curriculum characteristics of the constructed MOOC have the characteristics shown in Figure 5.

3.4. Differences with Traditional 3P English Teaching Model. "The traditional 3P English Teaching model is a CL-communicative Language Teaching developed in the 1970s on the basis of behavioral psychology and structuralist linguistics"; the so-called 3P refers to the three stages of language teaching: Presentation, Practice, and Production. In the process of English teaching, the teacher first presents the language knowledge through teaching and then lets the students master the language knowledge in the practice.
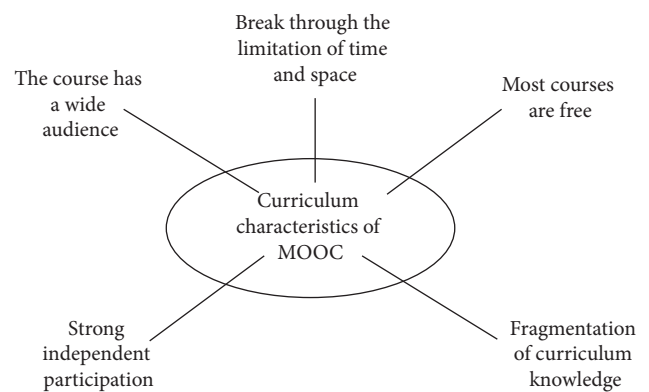
Figure 5: MOOC curriculum characteristics.

Finally, under the controlled or semicontrolled state, let the students carry on the hypothesis communication and realize the language output, so as to complete the teaching process.

The pattern of students in the class teaching target required to master the English language form, the student by the English teacher in a language independent project explained and classroom practice, can in one pace reach the designated position to master the content of classroom teaching and use, with teaching and promoted learning, thinking that as long as the teacher explained, students could master, and in fact, it is hard to achieve this goal. Its classroom teaching form focuses on language input, emphasizing the mechanical practice and accumulation of language knowledge. This kind of simple and crude knowledge indoctrination plus monotonous and boring language practice is easy to have a negative impact on students' learning interest and enthusiasm; in teaching evaluation, teachers generally adopt summative evaluation (examination and test, etc.), usually focusing only on learning results.

The advantages of this mode are as follows: first of all, it ensures teachers' dominance, facilitates teachers' classroom organization and management, and improves the effectiveness of classroom teaching. Secondly, it emphasizes the controllability of teaching, which can effectively guarantee the systematic teaching of language structure and form. Finally, paying attention to the participation of students, students' practice is carefully designed by teachers, which is conducive to achieve the best teaching effect.

However, this mode is also accompanied by self-evident defects: first, the 3P mode is a teaching mode of one-way knowledge transfer centered on "teaching before learning," which ignores the real needs and learning status of students [18]. Second, the 3P mode is limited by time and space, so it is difficult to set personalized teacher-student interaction and teaching schedule. Thirdly, 3P mode emphasizes English language form rather than language content, which leads to imbalance between the two. Fourthly, due to the emphasis on language forms, the compilation of teaching syllabus is mainly based on grammar, which is difficult to take into account the rules of grammar acquisition of second language learners and cannot internalize the development system of interlanguage grammar of second language learners.

4. Result Analysis and Discussion

This study will compare and analyze the difference in teaching effects caused by 3P teaching mode and MOOC-based O2O teaching mode of vocational English through experiments, so as to explore the feasibility of MOOC-based O2O teaching mode of vocational English.

4.1. The Experimental Process. For data availability and scientific reliability reasons, the samples of this experiment came from two classes with similar average scores in foreign nursing major of a vocational and technical college in Fujian and were randomly divided into experimental class and control group [19]. The experimental class (52 students) adopts the VOCATIONAL English O2O teaching mode, while the control class (51 students) adopts the traditional 3P teaching mode. The two classes are completely the same in

teaching materials, teachers, class hours, and other aspects, but the only difference is the adoption of different teaching modes. Using this sample, we can better compare the learning gap between classes under different teaching modes.

In the teaching process, the author adopts the O2O teaching mode of Higher vocational English for the experimental class, focusing on the use of MOOC video platform resources to guide students to conduct online autonomous learning, while the control class continues the traditional 3P teaching mode, focusing on classroom teaching. As shown in Table 3, the author took New Horizons English Course Unit 4Science and Technology as the classroom Teaching example.

4.2. Analysis of Experimental Results. The test paper is of grade B of the National College English Application Ability Test, as seen in Tables 4–9. The result is used as the pretest result. Then, the independent sample T test was used for statistical analysis of the pretest scores of the experimental class and the control class, and there was no significant difference in the English pretest scores of the two groups ($P = 0.210 > 0.05$). The test is to compare the differences between the two groups of data, whether there is statistical significance; the premise of t-test is that the two groups of data are from normally distributed groups, and the variance of the data is uniform, which satisfies the independence. Independent sample T test (there is no correlation between experimental treatment groups, that is, independent samples) is used to test the difference of data obtained by two groups of unrelated samples. Therefore, before the teaching experiment, the starting point of the experimental class and the control class was the same, and there was no significant difference in the English level [20].

At the same time, the author also used paired sample T test to make a comparative analysis of the pre- and posttest scores of the experimental class and the control class, respectively. T test results of paired design samples before and after test results of experimental classes were $T = -8.764$, DF = 51, P value of bilateral test (Sig.) = 0.000 < 0.005, indicating that there were significant differences in the test results before and after test results of experimental classes [21]. The t-test result of paired design sample of the control class's pre- and posttest scores is $T = -1.646$, DF = 50, and P value (Sig.) = 0.106 > 0.005, indicating that the pre- and posttest scores of the control class are improved, but there is no significant difference. The above experimental results show that, compared with the traditional English 3P teaching mode, higher vocational English O2O teaching model can improve students' English scores on the whole.

In this experiment, the national standardized examination papers were used for both pretest and posttest, and the examination process was supervised by camera. In order to ensure the reliability and validity of the test results, the English teaching and Research Section of the college arranged the flow marking.

The statistical results show that the pretest and posttest scores of both the experimental class and the control class are normally distributed, while the posttest scores of the

Table 3: Examples of classroom teaching.

	Experimental class	Comparative class
Teaching goal	Vocabulary. grade A3/B22/superclass 6grammar: adjoint adverbial (adjoint adverbial) text: understand and repeat. Listening and speaking: understanding and expressing. Vocabulary. grade A3/B22/superclass 6grammar: adjoint adverbial (adjoint adverbial) text: understand and repeat. Listening and speaking: understanding and expressing	Vocabulary. grade A3/B22/superclass 6grammar: adjoint adverbial (adjoint adverbial) text: understand and repeat. Listening and speaking: understanding and expressing. Vocabulary. grade A3/B22/superclass 6grammar: adjoint adverbial (adjoint adverbial) text: understand and repeat. Listening and speaking: understanding and expressing
Teaching mode	English O2O teaching model in higher vocational education	3P teaching mode
Curriculum evaluation system	Formative evaluation (result of debate) + (final exam) price (platform unit clearance test)	Final evaluation (unit small test + midterm exam)
Instructor	The author (supplementary 1 class hour) foreign teacher (classroom discussion 1 class hour)	The author (4 hours in the text) the foreign teacher (2 hours of listening and speaking training)
Teaching process	I preclass autonomous learning (2 hours): students learn autonomously on the teaching platform and complete the online communication and feedback of the platform test. II classroom learning (2 hours):	I Introduction + text explanation (2 hours) II grammar explanation and practice (2 hours) III listening and speaking training (2 hours)
Oral classroom content	II after class autonomous learning (2 hours): students complete unit test platform to expand learning online communication and feedback on the teaching platform. Organize students to "is the development of modern science and technology bringing happiness or misfortune to mankind?" group debate for the debate (1 class hour of discussion)	Organize students to "is the development of modern science and technology bringing happiness or misfortune to mankind?" group debate for the debate (1 class hour in oral English)

Table 4: Comparison of pretest results.

Group	Number of people	Mean	Standard deviation	The standard error of the mean
Experimental class	52	78.0192	8.011	1.11093
Control class	51	75.8627	9.03165	1.30249

Table 5: Independent sample T test.

	F	Sig.	T	df	Sif (bilateral)	Mean difference	Standard error value	95% confidence interval for difference	
								Lower bound	Upper bound
Assume that the variances are equal	3.06	0.083	1.262	101	0.21	2.15649	1.70942	−1.23455	5.54752
Assume that the variances are not equal			1.26	98.238	0.211	2.15649	1.71191	−1.24064	5.55362

Table 6: Comparison of posttest results.

Group	Number of people	Mean	Standard deviation	The standard error of the mean
Experimental class	52	84.0385	6.1356	0.85085
Control class	51	78.5686	7.85431	1.09982

Table 7: Independent sample T test.

	F	Sig.	t	df	Sif (bilateral)	Mean difference	Standard error value	95% confidence interval for difference	
								Lower bound	Upper bound
Assume that the variances are equal	3.15	0.079	3.943	101	0	5.46983	1.38723	2.71794	8.22173
Assume that the variances are not equal			3.934	94.555	0	5.46983	1.39053	2.70912	8.23055

TABLE 8: Comparison of performance before and after.

		Mean	Number of people	Standard deviation	The standard error of the mean
Control 1	Experimental preclass testing	78.0192	52	8.011	1.11093
	Experimental class posttesting	84.0385	52	6.1356	0.85085
Control 2	Control class pretesting	75.8627	51	9.30165	1.30249
	Control postclass testing	78.5686	51	7.85431	1.09982

TABLE 9: Paired sample T test.

		The ingredients are different						
		Mean	Standard deviation	The standard error of the mean	95% confidence interval for difference		t	Sif (bilateral)
					Lower bound	Upper bound		
Control 1	EC1-EC2	−6.01923	4.95268	0.68781	−7.39807	−4.6404	−8.764	0
Control 2	EC1-EC2	−2.70588	11.74273	1.64431	−6.00858	0.59681	−1.646	0.106
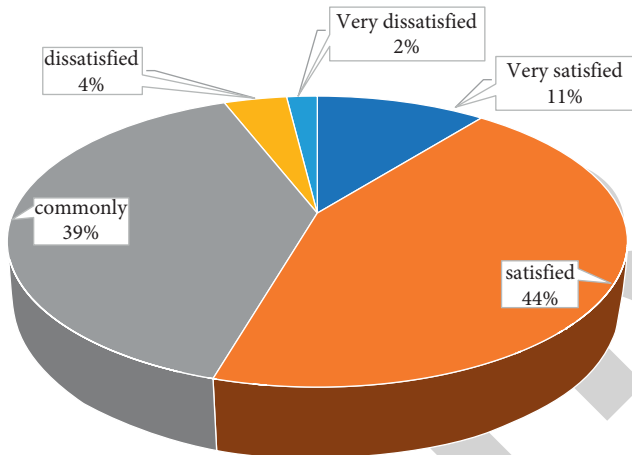
FIGURE 6: Students' satisfaction with online learning.

experimental class are significantly higher than those of the control class. The difference between the two is significant, indicating that the O2O teaching mode of English in vocational colleges is indeed conducive to improving the teaching effect [22]. The experimental results show that the O2O teaching mode of Higher vocational English has a significant positive correlation with the learning effect of higher vocational students, which has certain effectiveness and feasibility. Through empirical comparison, we can see the superiority of the English teaching model adopted in this paper, which provides empirical evidence for the demonstration of this paper.

Students' satisfaction with online teaching is shown in Figure 6:

5. Conclusion

In order to improve the quality and effect of higher vocational English teaching and better design of higher vocational English courses, this paper constructed a new O2O higher vocational English teaching model, focusing on the construction of O2O teaching platform based on contains, and improving the traditional 3 P English teaching model. And this article carries on the empirical test to the two teaching modes. In this paper, the experimental samples were selected from two classes of foreign-related nursing major in a vocational and technical college of Fujian, which were randomly divided into experimental class and control group. The experimental class (52 students) adopts the vocational English O2O teaching mode, while the control class (51 students) adopts the traditional 3P teaching mode. The two classes are completely the same in teaching materials, teachers, class hours, and other aspects, but the only difference is the adoption of different teaching modes.

In the teaching process, the author adopts the O2O teaching mode of higher vocational English for the experimental class, focusing on the use of MOOC video platform resources to guide students to conduct online autonomous learning, while the control class continues the traditional 3P teaching mode, focusing on classroom teaching. Through empirical analysis, this paper finds that using MOOC video platform resources to guide students to conduct online autonomous learning has better learning efficiency.

On the one hand, through the analysis and summary of a large number of domestic and foreign literature, and a questionnaire survey of English autonomous learning of vocational college students, so as to determine the construction scheme of O2O teaching platform resource management system in vocational College English, based on the theory of constructivism, it integrates the advantages of MOOCs and flipped teaching and designs an O2O teaching model suitable for vocational college students, which is compatible with online and offline teaching methods.

On the other hand, this paper conducts an experimental study on the MOOC-based O2O teaching mode of higher vocational English [23]. This study takes two classes of nursing major in a vocational and technical college in Fujian as the experimental objects, compares and analyzes the differences between the two teaching modes through

experiments, and makes statistical analysis on the experimental results with SPSS19.0. This paper proves that the O2O teaching mode of higher vocational English has certain effectiveness and feasibility, and the rational use of this mode in teaching can help enhance students' learning initiative and improve their English practical application ability.

The result of this teaching reform means that higher vocational English teaching has been promoted to a new level, especially the O2O teaching platform of higher vocational English based on MOOC has provided strong support for higher vocational students to improve their autonomous learning ability.

It is often said that "there is a method in teaching, but there is no fixed method in teaching. It is important to get the method and innovate the method." All kinds of new theories and methods of English teaching emerge endlessly, but any kind of teaching model inevitably has some shortcomings and defects, and so does the O2O teaching model of English in vocational colleges. Although online autonomous learning can well achieve relevant educational goals, it cannot completely replace traditional 3P classroom teaching, let alone school education. Therefore, the two teaching modes can permeate and complement each other, combining online autonomous learning with offline classroom teaching. Only by adopting the corresponding teaching mode according to the actual situation of teaching can we promote the transformation of English language knowledge into English language skills and the formation and development of learners' comprehensive English language ability. At the same time, from the comparative research experiment of the two teaching modes, we can find that higher vocational English O2O teaching mode has certain advantages and advanced, but how to deeply explore the deep potential and application value of this teaching mode and really play the role of HIGHER vocational English O2O teaching platform and online autonomous learning in English learning, so as to provide a certain theoretical and practical basis for the future development of Vocational English teaching, is still a problem to be further studied and discussed.

To sum up, in the application of English classroom teaching method, we can find an appropriate meeting point between form and content, so that we can utilize the O2O teaching mode of English in vocational colleges and organically combine the traditional 3P teaching mode and online autonomous learning mode in the MOOC environment. The English teaching experiment we try under the guidance of constructivism theory has a certain theoretical basis and practical significance, and the teaching plan designed under the guidance of this theory can indeed promote the development of English classroom teaching method and achieve the purpose of enhancing the effect of classroom teaching.

Data Availability

The labeled data set used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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Hindawi

Retraction

Retracted: Exploring Evaluation of Enterprise Economic Benefits Using Big Data

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] X. Liu and Y. Li, "Exploring Evaluation of Enterprise Economic Benefits Using Big Data," *Journal of Environmental and Public Health*, vol. 2022, Article ID 1103561, 9 pages, 2022.

Research Article

Exploring Evaluation of Enterprise Economic Benefits Using Big Data

Xiaoqian Liu[1] and Yujia Li [2]

[1]*Green Innovation Industrial Institute, School of Economics and Management, Chengdu Technological University, Chengdu 610000, China*
[2]*School of Business College, Changchun Guanghua University, Changchun 130000, China*

Correspondence should be addressed to Yujia Li; weisl21@mails.jlu.edu.cn

The purpose is to improve Chinese enterprises' economic benefit evaluation system based on big data and promote sustainable enterprise production. This paper studies the power supply enterprises-oriented Evaluation Index System (EIS) under the big data environment. Firstly, it expounds on the construction theory of the enterprise economic benefit model. Secondly, the comprehensive Grey Model (GM) based on improved weight and the power consumption prediction model based on Least Mean Square (LMS) neural network (NN) algorithm are introduced. Finally, the comprehensive GM model based on improved weight is used to evaluate the economic benefits of power supply enterprises. The power consumption prediction model based on the LMS-NN algorithm is used to predict the sustainable development of power supply enterprises. The results show that the profitability and solvency of joint-stock power companies are about 90 and 100, respectively, and the social contribution of state-owned power supply enterprises is the strongest. Lastly, it is predicted that the region will have 134.8 billion kWh of electricity and about 137.2 billion kWh of power consumption in 2020. The growth model and trend are consistent, but there are some errors in the specific power consumption data. Therefore, the audit method based on big data has a good evaluation effect on the economic benefits of enterprises. For example, the profits of private and joint-stock power supply enterprises are relatively high. In contrast, state-owned power supply enterprises have outstanding social contribution ability. The big data method is used to predict the power consumption in some areas, and the predicted value is consistent with the actual value. This study provides a reference for the follow-up economic benefit evaluation and sustainable development of enterprises.

1. Introduction

Enterprises are the main vitality of national and social-economic development, and the economic benefits of enterprises are the foundation of their existence and development because all the behaviors and management activities of an enterprise are carried out based on economic benefits. Electric power enterprises are an important part of the national economy and energy supply, as well as the basis for the national economy and national financial revenue [1]. The rise and fall of electric power enterprises will fundamentally affect the national social economy and energy security, which means that the economic benefits of their enterprises will also affect the national fiscal revenue and the sustainable development of energy. Because of their particularity and importance to the country, power supply enterprises may be different from other industries, and even monopolistic behaviors may occur. Although the relevant departments of the national government have taken many methods and measures, little effect has been achieved. The biggest problem of power enterprises is that there is no competition. In other words, some power supply enterprises or companies have no sense of competition in the whole industry market, which leads to low enthusiasm within the enterprises, which makes the environment of power supply enterprises complicated and then directly affects the economic effect of enterprises [2]. Therefore, an Evaluation Index System (EIS) should be established for enterprise economic benefits. This is of great

help for analyzing the profitability of power supply enterprises and solving their existing problems.

With the rapid development of information technology, Internet technology based on big data has been integrated into various industries in people's lives and has a very broad prospect in energy utilization fields, such as power engineering. Due to the rapid development of the electric power industry, traditional data processing methods have been unable to deal with related applications faster and more accurately, so the use of big data method has become the best data processing method for modern enterprises, including power supply enterprises. Big data is not just cloud computing that expands the amount of simple data. Compared with traditional statistical methods, big data can quickly find and process data. When operating on interconnected data, it also considers the relationship between the data. It can find problems and reduce risks, to achieve the required work effect [3]. Big data also has a good application effect in the evaluation of the economic benefits of enterprises. Particularly, data information sharing and intercommunication can be realized by applying the big data audit record method to the economic benefit review and evaluation, establishing an economic benefit EIS for electric power enterprises, and evaluating and storing the economic benefit data of each power supply area or unit. This is conducive to the analysis of benefit evaluation data, thus discovering and solving relevant problems improving the economic benefits of the enterprise, and reducing the risk of unfavorable factors. Nations are carrying out prototype research on the Internet of Energy (IoE) like Germany and Japan with small-scale pilot applications. In 2008, Germany selected six pilot areas based on smart grid to carry out the four-year *E*-Energy technology innovation promotion plan and the national natural science foundation project "Future Renewable Power Energy Transmission and Management System." Foreign scholar Rokita-Poskart (2017) established an enterprise economic benefit EIS using financial and nonfinancial indicators, such as financial leverage ratio, activity ratio, profit, and loss ratio [4]. Afterward, the economic benefits of some enterprises are evaluated through similar technology priority methods and a fuzzy Analytic Hierarchy Process (AHP). IoE technology has also attracted widespread attention in China. China's State Grid has also proposed and promoted the global IoE strategy. Domestic scholars Liu et al. evaluated the comprehensive benefits of selected listed companies using the factor analysis method [5]. The results obtained by the model analysis were consistent with the development performance of listed companies.

To sum up, China's enterprise economic benefit EIS is not perfect, and relevant research is scarce. At present, enterprise financial data cannot be well audited and counted. Particularly, some power supply enterprises have problems, such as imperfect economic benefit audit, incomplete financial data, information exchange, untimely revenue, and expenditure. Therefore, this paper researches domestic power supply enterprises using Big Data Technology (BDT) and improves their economic benefit EIS. It realizes the sustainable development of enterprise production capacity.

It aims to provide a reference for the subsequent economic benefit evaluation and sustainable development of enterprises. The innovation of this paper is that the comprehensive Gray Model (GM) based on improved weight is used to evaluate the economic benefits of power supply enterprises. The power consumption prediction model based on Least Mean Square (LMS) NN algorithm is used to predict the sustainable development of power supply enterprises.

2. Methods

2.1. Enterprise Economic Benefit Model Construction Theory Elaboration

2.1.1. Enterprise Economic Benefit Evaluation. Enterprise economic benefit is also called financial-economic benefit evaluation, which is essentially an evaluation of enterprise financial benefit from the perspective of financial revenue forecast and enterprise management. Among them, the profitability and debt repayment ability of an enterprise are two very important indicators to evaluate the economic benefits of an enterprise, which can be used to judge the economic benefits of an enterprise, such as its operating status, financial revenue, and sustainable development feasibility [6].

2.1.2. The Big Data Audit Method. The big data audit is an emerging data processing technology based on big data in the Internet environment. Big data audit can carry out network-based cloud computing for simple and complex data, use the network or database to search and obtain the required data, show the relationship and association of these data, and show the data changes and dynamic trends by algorithm-built models [7]. The big data audit method can determine the processing order of data audit, thus realizing the static and dynamic simulation analysis of data and the data control and monitoring from the field to the remote. The economic benefit EIS of electric power enterprises is established by applying the big data audit method to the economic benefit of enterprises. The evaluation and storage of the economic benefit data of each power supply area or unit and the realization of data information sharing and communication are conducive to the development of the benefit EIS of enterprises.

2.1.3. Financial Performance Indicators. The traditional economic evaluation of power generation projects mainly focuses on financial benefit analysis. The main idea is to discount the project's cash inflow and cash outflow at an appropriate discount rate and calculate the Financial Net Present Value (FNPV). Then, FNPV is used to judge the project's profitability by comparing it with the number 0. Under the background of a low-carbon economy (LCE), power generation enterprises may face many uncertain profit-making factors. This calculation method does not fully reflect the real benefits of power generation projects. The calculation results may affect the Decision-Making (DM) of power generation enterprises on relevant projects. In
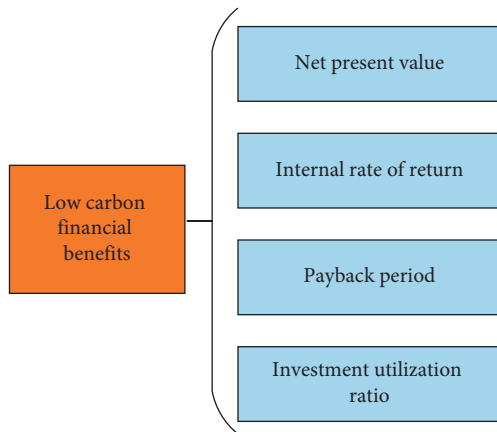
FIGURE 1: Financial benefit evaluation indicators.

particular, carbon emissions and carbon tax and other factors can be introduced into the economic benefit evaluation of power generation projects from the perspective of the enterprise. Doing so can value some hidden benefits of low-carbon power generation projects and then correctly evaluate the economic benefits of power generation projects. The financial benefit indicators of enterprises are usually evaluated through Financial Net Present Value (FNPV), Internal Rate of Return (IRR), Dynamic Investment Payback Period (PP), and ROI (Return of Investment), including dynamic and static indicators [8], thus realizing project financial decisions. Here, the low-carbon benefit indicator is used to evaluate the economic benefit of power supply enterprises. In this way, the financial revenue and profitability of power supply enterprises in the low-carbon economy can be analyzed and expressed intuitively and systematically during the calculation period to ensure the sustainable development of economic benefits of enterprises. The selection of low-carbon financial benefit indicators is shown in Figure 1.

2.1.4. NN. The NN is a kind of nonlinear network structure based on the structure and function of the animal or human brain, which can be divided into two kinds: biological NN and artificial neural networks (ANN). In machine learning and net-related neighborhood, the animal NN is generally used [9]. NN is composed of interconnected neural units that can be used to predict and analyze large amounts of input data or some relatively complex unknown approximate functions. Because there is a nonlinear relationship between thinking, logic, and analysis in the brain and intelligence, the nonlinear relationship is also common in nature. According to the complexity of the target object or research thing, the NN can realize the process of hiding or expressing the data by changing the interrelation between the network nodes, namely, the weight value. Moreover, the NN has the characteristic of self-learning. The NN can use the training and deep learning process to readjust the structure, adapt to the needs of different data information processing and storage, and better express the relationship between input and output information data [10].

2.1.5. Weight Determination Method. Weight determination methods can be divided into subjective weight method, objective weight method, and subjective and objective weight method. The subjective weighting method has the advantage of the relative concentration of experience and opinions and can modify the data in continuous feedback according to the subjective consciousness or importance of each indicator to obtain the required results. Indicator comparison method, two-way assignment method, and binomial coefficient method are commonly used subjective weighting methods. The objective weighting method is a statistical method that uses the information of indicators to determine the decision matrix. The weight of the matrix is obtained by objective operation, and the entropy method is commonly used. The objective weighting method combines the subjective weighting method and the objective weighting method. A certain weight coefficient is allocated so that the determined weight can reflect subjective and objective information.

2.2. Construction of Enterprise Economic Benefit Evaluation Model

2.2.1. Determination of the Weight of Indicators. The established quantitative indicators can intuitively calculate data. In order to make the evaluation more objective, the entropy method and Analytic Hierarchy Process (AHP) are used to determine the objective weight and the subjective weight, respectively. Then, the objective and subjective weights are combined based on a specific coefficient to obtain the combination weight coefficient of the evaluation index.

First, the economic evaluation indicators of enterprises are selected, and the weights of each indicator can be determined by subjective and objective weighting methods, as shown in Figure 2.

The subjective and objective weighting method distributes certain weight coefficients so that the determined weight can reflect the subjective and objective information [11].

Here, subjective and objective weighting methods are used to determine the quantitative indicator of enterprise economic benefit evaluation. The objective weight of economic benefit is determined by the entropy method. AHP is used to determine the subjective weight of economic benefits. Then, the combination coefficient is used to evaluate the results obtained by the two methods and then the combined weight coefficient of the evaluation indicator is obtained.

2.2.2. The Entropy Value Method. Standardization of data: due to different dimensions of different indicators, the initial data are standardized and comparatively analyzed [12]. The standardized expression reads

$$y_{ij} = \frac{x_{ij}}{\sum_{i=1}^{n} x_{ij}}. \tag{1}$$

In (1), y_{ij} refers to the contribution degree of the ITH scheme in the JTH indicator attribute. x_{ij} refers to the indicator of the ITH scheme in the JTH indicator attribute.
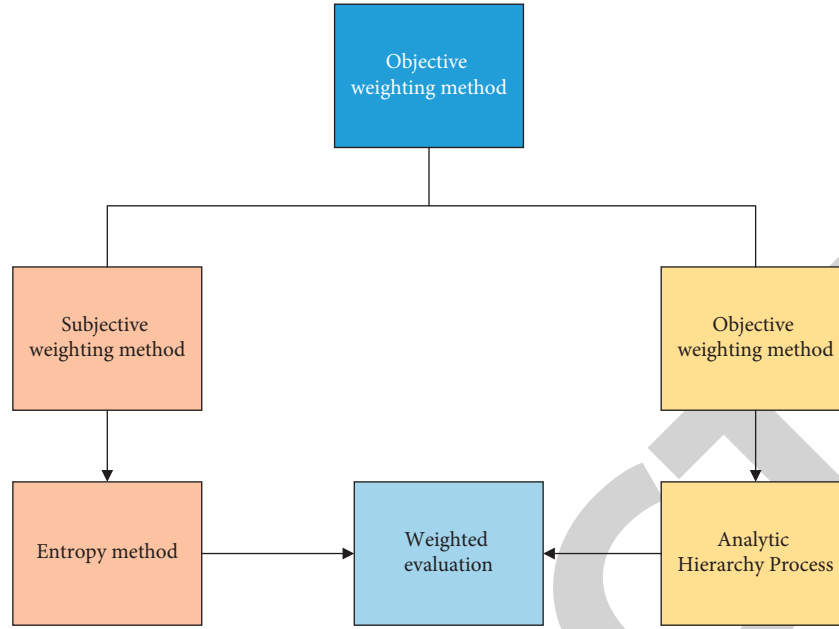
Figure 2: Quantitative framework of enterprise economic benefit evaluation based on big data and subjective and objective weighting method.

The calculation of the entropy of the JTH indicator, e_j, reads

$$e_j = -k \sum_{i=1}^{m} y_{ij} \ln y_{ij}, \qquad (2)$$

where e_j refers to the total contribution of all schemes to the second indicator and k refers to a constant. When all schemes in the indicator attribute are close to the same, the total contribution of all schemes to the third indicator will be close to 1. When the contribution is close to the same, it means that the indicator attribute has no role in the decision, so when the target attribute is not considered, the value of the target attribute can be determined as 0 [13].

$$g_j = 1 - e_j, \qquad (3)$$

where g_j is the differential coefficient of an indicator. The larger the value of g_j, the more the attention paid to the role of the indicator.

$$w_j^1 = \frac{g_j}{\sum_{i=1}^{n} g_j}, \qquad (4)$$

where w_j^1 determines the weight coefficient.

2.2.3. Comprehensive Evaluation Model of Gray Correlation Method.
During the evaluation matrix determination, the fuzzy AHP has strong subjectivity and uncertainty [14]. Here, the gray correlation method is used to determine the value of the economic benefit evaluation matrix. The correlation coefficient between the reference sequence and comparison sequence is used to judge the difference between different power supply enterprises. The comparison sequence of indicators for each scheme reads

$$x(j) = \{x(1), x(2), x(3) \ldots x(n)\}. \qquad (5)$$

$i = 1, 2, 3, \ldots, n$ is the number of schemes.

The indicators are preprocessed. The indicators adopted here include power generation capacity $A1$, profitability $A2$, debt repayment capacity $A3$, financial maintenance capacity $A4$, and social contribution capacity $A5$.

Parameter sequence selection: parameter series is the evaluation standard for each economic benefit. The parameter sequence corresponds to the evaluation indicator and is the set of the best quality; that is, the optimal indicator is selected. For example, when the indicator indicates profitability, the maximum value should be calculated and selected to reflect the profitability of the power supply enterprise. The expression of the reference sequence reads

$$x_1(j) = x_1(1), x_1(2), x_1(3), \ldots, x(n). \qquad (6)$$

In (6), $i = 1, 2, 3, \ldots, n$ represents the number of schemes.

Further, the indicators are nondimensionalized [15]. The dimensions of evaluation indicators differ. Before the evaluation, the dimensionless indicator information can be unified to reduce the interference from random factors.

The correlation coefficient is calculated. The correlation coefficient is calculated from the comparison sequence and the reference sequence through the matrix.

2.3. Prediction of Power Consumption Sustainability Based on the NN Algorithm

2.3.1. Neuron Model.
Linear purelin function is used in the neuron model [16]. The neuron model is shown in Figure 3.
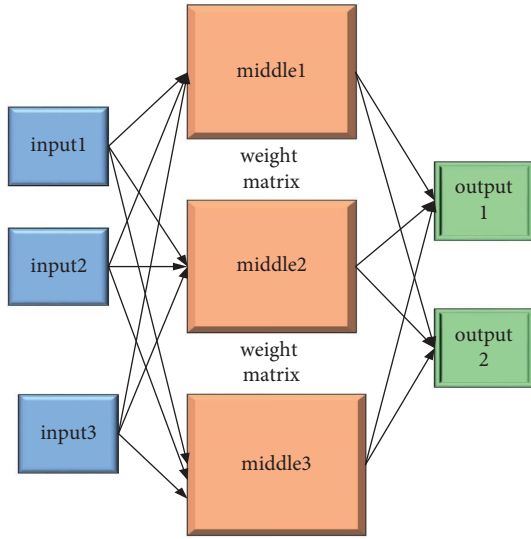
Figure 3: Neuron model.
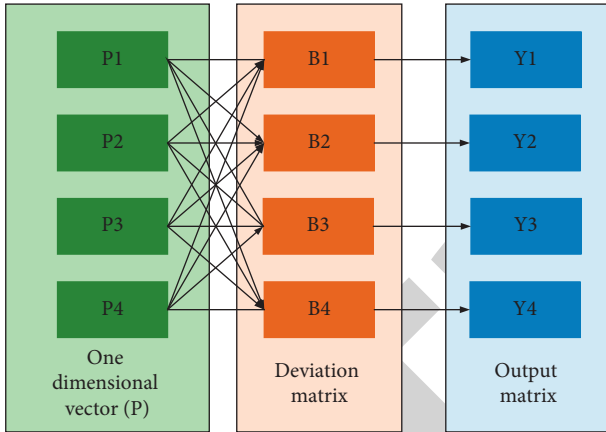
Figure 4: Network structure diagram.

2.3.2. NN Structure.

A NN consists of many neurons, and each neuron can have an output. As shown in Figure 4, their relationship is shown in the following equation:

$$y = \text{purelin}(w * p + b). \tag{7}$$

In (7), p refers to the input one-dimensional vector, b is the deviation matrix, y represents the output matrix, and w is the weight matrix. Purelin function is used for calculation.

2.3.3. Windrow-Hoff Learns the Rules.

W-H learning rule (Windrow-Hoff) is a judgment standard for NN convergence based on the Least Mean Square (LMS) algorithm proposed by Windrow and Hoff. The group of W-H learning rules is used to modify the weight vector. The process of the perceptron is simplified by error-correcting learning rules to make it simpler [17]. The calculation process is shown in Figure 5.

The function of the linear NN is to process the mean-variance of the resulting error so that it can be reduced to the lowest value. That is, the actual output is determined at an
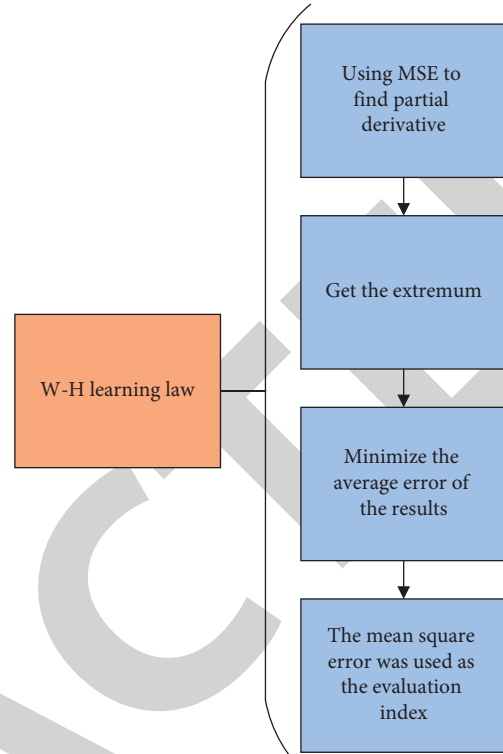
Figure 5: W-H learning rule calculation process.

optimal value, and the lowest result error can be obtained using the following equation:

$$e(n) = d(n) - x(n) * w(n). \tag{8}$$

In (5), $d(n)$ refers to the expected output, $x(n)$ and $w(n)$ represent the actual output, respectively, and $e(n)$ denotes the error between the expected output and the actual output.

2.3.4. LMS Learning Algorithm Training Process.

First is the variables and parameters' setting. Specifically, $W(n)$ and $X(n)$ are set as the weight vector and the input vector, respectively, and their expressions read

$$X(n) = \left[1, x_{1(n)}, x_{2(n)}, x_{3(n)}, x_{4(n)}, \ldots, x_{m(n)}\right]^T, \tag{9}$$

$$W(n) = \left[w_{1(n)}, w_{2(n)}, w_{3(n)}, w_{4(n)}, \ldots, w_{m(n)},\right]^T, \tag{10}$$

where $X(n)$ is the input vector, namely, the training sample, $W(n)$ represents the weight vector, m and n are the numbers of input vectors, and T is the number of iterations.

A relatively small random nonzero value is assigned to $W_j(0)$ to initialize the weight vector. For a set of input samples $X(n)$ and the corresponding expected output d, $e(n)$ is calculated, and iteration is computed [18]. The specific expression reads

$$W(n + 1) = W(n) + \eta X^T(n) * e(n). \tag{11}$$

In (11), $e(n)$ represents the error between the expected output and the actual output, and η is the calculation coefficient.

TABLE 1: Indicators of different power supply enterprises.

Type of power supply enterprise	Total indicator	A_1	A_2	A_3	A_4	A_5
Private	0.6604	1.0004	0.9581	0.5200	0.9876	0.4830
State-owned	0.2413	0.0832	0.000	0.0000	0.2563	0.5508
Joint-stock	0.6802	0.2365	0.9732	1.0036	0.6980	0.5071

Then, the results are judged; if the results meet the convergence conditions, the algorithm can be finished. If the convergence condition is not met, the n value needs to be increased by 1 and returned to the third step [19]. The required condition is that the error of the calculation result is less than the specified value ε; that is, the error value between the expected output and the actual output is less than ε. The weight change is very small, so the absolute value of the change in the weight vector is less than ε. Additionally, the number of iterations should be set, namely, the number of limits. When the number of iterations reaches the specified number or the highest iteration value, the algorithm will end. In this way, the algorithm calculation can be prevented from entering an infinite loop, resulting in no result or incorrect result [20].

The experimental data are Beijing's population and economic data from 2000 to 2020 from the 3E sustainable development platform according to the values of multiple factors affecting power consumption. At the same time, some resource websites are reviewed, such as the Beijing Statistical Yearbook and the National Bureau of Statistics, to collect Beijing's social power consumption data from 2000 to 2020. Through regression analysis, historical data can be obtained.

3. Results

3.1. Analysis of Influencing Factors of Economic Benefit Evaluation of Power Supply Enterprises Based on Big Data.
This experiment takes private, state-owned, and joint-stock power supply enterprises as the research object. The economic benefit EIS of power supply enterprises reported here mainly decomposes the economic benefit audit objectives, such as economy, efficiency, and effectiveness. It uses the balanced scorecard method in the four dimensions of finance, customers, internal business process, learning, and growth. There are two-level indicators and three-level indicators under the four dimensions. The three-level indicators adopt combined qualitative and quantitative methods to refine and set different evaluation indicators. Five indicators are set for evaluation, including power generation capacity A_1, profitability A_2, debt repayment capacity A_3, financial maintenance capacity A_4, and social contribution capacity A_5.

Table 1 and Figure 6 show that the economic benefit evaluation ability of private and joint-stock electric power companies is higher than that of state-owned electric power enterprises on the whole. The difference between a private electric power company and a joint-stock electric power company is not very big, the data size of different indicators is not the same, and they both have their specific advantages. For example, the profitability and solvency of joint-stock
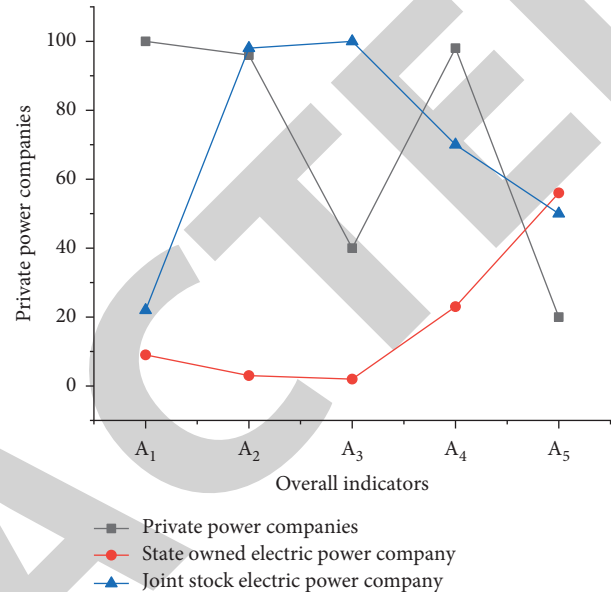
FIGURE 6: Evaluation of operation economic benefit of different power supply enterprises.

power companies are around 90 and 100, respectively. And in terms of social contribution, it is much better than private power enterprises. The power generation capacity and sustainable development capacity of private power supply enterprises are the highest among the three power supply enterprises. Moreover, the profitability of private enterprises is similar to that of stock power enterprises, but their social contribution is relatively small, which needs to be improved. Overall, private power supply enterprises are worse than joint-stock power supply enterprises. The analysis shows that state-owned power supply enterprises have the worst economic benefit evaluation. Hence, state-owned power supply enterprises have poor economic benefits, and there are also big problems in profitability and solvency. The evaluation indicators are relatively low, and even negative economic growth may occur. But state-owned power supply enterprises have great advantages over private enterprises and joint-stock enterprises in terms of social contribution ability, because state-owned power supply enterprises themselves have certain policies to benefit the people [21], and they can be maintained despite poor economic benefits.

3.2. Prediction Results of Sustainable Development Based on Big Data Method.
The electricity consumption situation of some areas from 2000 to 2016 is input into the prediction model [22], and the predicted value is shown in Figure 7. Figure 7 indicates that the electricity consumption in this area increases steadily at a certain rate. In 2020, there are
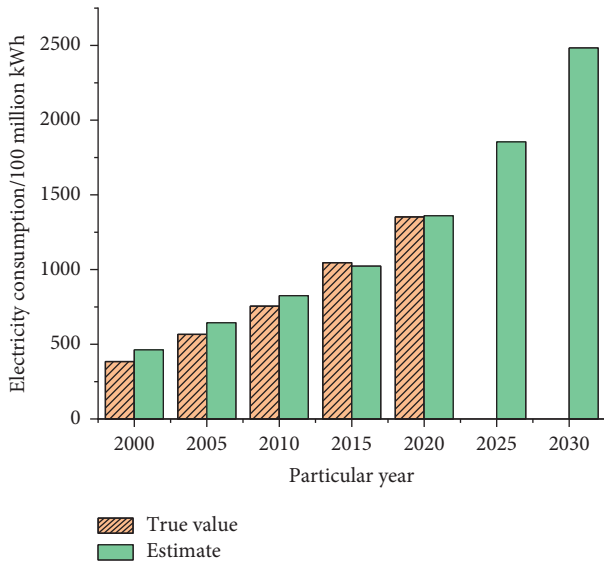
FIGURE 7: Comparison of the actual and predicted value of electricity consumption (only predicted value after 2021).

TABLE 2: Comparison of prediction models based on different algorithms (A is regression model, B represents GM, and C denotes LMS-NN model).

Time	Electricity consumption per billion kilowatt-hours	A the relative error (%)	B the relative error (%)	C the relative error (%)
2011	660.01	3.90	−4.82	−0.70
2012	690.70	0.45	−2.25	1.05
2013	740.20	1.90	−3.35	0.60
2014	809.90	2.70	−6.40	0.20
2015	823.21	−2.16	−2.09	0.52
2016	874.28	−1.09	−2.40	0.50
2017	918.11	−1.30	−0.88	4.08
2018	938.01	−3.60	2.50	0.15
2019	960.80	−6.70	6.95	−1.38
2020	1028.27	−8.90	6.01	0.16

134.8 billion kilowatt-hours of electricity in the area, which is relatively high. When electricity consumption is around 137.2 billion KWH, the growth pattern and trend are relatively consistent. But there are some errors in the specific data of electricity consumption.

Table 2 demonstrates that the relative error of the prediction model based on the LMS-NN algorithm is smaller than that of the regression model and gray prediction model. Although the trend of electricity consumption predicted by the three models is the same, the growth rate is different. The actual value of electricity in the area is also different. The prediction effect of the LMS-NN is much better than that of the regression model and GM, and it is more accurate in some specific electricity data. For example, from 2011 to 2015, certain measures are taken to control population growth in the region due to the implementation of the sustainable development strategy. Therefore, the growth rate of electricity consumption during this period has declined

and the trend has slowed down. The regression model and GM have a large prediction error for this phenomenon and do not show this trend well. The fitting effect of the LMS-NN is very good, and the prediction model shows this trend. This is because the LMS algorithm can obtain a relatively high convergence speed when the number of weights of the NN is small, reduce iterations, improve prediction accuracy, and minimize the mean error variance. That is, the actual output is determined at an optimal value, and the equation can be used to obtain the lowest error. In conclusion, the power consumption prediction model based on the LMS-NN algorithm can predict power consumption sustainability.

Overall, the comprehensive GM based on improved weight is used to evaluate the economic benefits of power supply enterprises. It is concluded that the audit method based on big data has a good effect on the evaluation of the economic benefits of enterprises. According to the economic benefit evaluation of power supply enterprises under different indicators, private power supply enterprises and joint-stock power supply enterprises have high profitability and solvency. The ability of state-owned power supply enterprises in the social contribution is more prominent than other enterprises. The prediction model based on the LMS-NN algorithm is used to study the sustainable development of power consumption of power supply enterprises. The big data method is used to predict power consumption in some areas. The trend of the predicted value is consistent with the actual value, and the prediction of power consumption sustainability is realized.

4. Conclusion

This paper mainly studies power supply enterprises-oriented economic benefit EIS in the big data environment. Firstly, it expounds on the construction theory of the enterprise economic benefit model and puts forward a big data audit method for the power supply enterprises-oriented economic benefit EIS. Then, the comprehensive GM model based on improved weight is used to evaluate the economic benefits of power supply enterprises. Besides, the sustainable development of power consumption of power supply enterprises is studied using the prediction model based on the LMS-NN algorithm. The results show that the audit method based on big data has a good effect on evaluating enterprise economic benefits. According to different indicators, private and joint-stock power supply enterprises have higher profitability and solvency than state-owned enterprises. The state-owned power supply enterprises are prominent in social contribution ability. According to the prediction of power consumption in some areas, it is concluded that the power consumption of the whole region will be 134.8 billion kWh in 2020, which is relatively high. The growth model and trend are relatively consistent when the power consumption is about 137.2 billion kWh. However, there are some errors in the specific data of power consumption. The trend of the predicted value is consistent with the actual value, and the

prediction of power consumption sustainability is realized. Although the economic benefits of enterprises are evaluated, and the sustainability of electricity consumption is predicted by combining the big data method, the collected enterprise data and model parameters still have errors. There is a certain gap between the predicted data and the actual data, which needs further research and improvement. Future research will study the NN, Support Vector Machine (SVM), and other models and combine them with sufficient experimental data. Based on this, it can make a reasonable prediction for the next 50 or even 100 years. More scientific-technical means promote the improvement and development of enterprise economic benefit EIS and contribute to the sustainable development of energy in China.

Data Availability

The simulation experiment data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Acknowledgments

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Hindawi

Retraction

Retracted: Exploring the Independent Learning of Music Students in Higher Teacher Training Colleges in a Pluralistic Network Environment

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] L. Zhang, "Exploring the Independent Learning of Music Students in Higher Teacher Training Colleges in a Pluralistic Network Environment," *Journal of Environmental and Public Health*, vol. 2022, Article ID 5024006, 9 pages, 2022.

Hindawi

Research Article

Exploring the Independent Learning of Music Students in Higher Teacher Training Colleges in a Pluralistic Network Environment

Lei Zhang (ID)

Department of Music, Tangshan Normal University, Tangshan 063000, China

Correspondence should be addressed to Lei Zhang; 124047@tstc.edu.cn

As the main base for training teachers, normal colleges and universities can not only reserve a large number of talents for the construction of teachers but also help to improve the professional quality and teaching ability of teachers. Carrying out research on music education in normal colleges and universities can further meet the diversified needs of the current society for music talents and promote the improvement of art cultivation and cultural level of music students in normal colleges and universities. This paper discusses the preparation work of higher normal music colleges under the new curriculum standards from four aspects: "experience learning, independent learning, cooperative learning, and inquiry learning." Later, through the method of questionnaire survey, starting from the survey of the independent learning motivation of 325 music education students, the independent learning situation of music education students under the network resources was analyzed, and the learning strategies were discussed from various aspects of students, teachers, and the school. By analyzing the current situation of music teaching in higher teacher training colleges from many aspects, and putting forward relevant suggestions according to the survey results, we hope to help the transformation of music teaching methods in the future and make contributions to the field of music teaching in China.

1. Introduction

As the main base for training teachers, normal colleges and universities can not only reserve a large number of talents for the construction of teachers but also help to improve the professional quality and teaching ability of teachers. Carrying out research on music education in normal colleges and universities can further meet the diversified needs of the current society for music talents and promote the improvement of art cultivation and cultural level of music students in normal colleges and universities. However, in the specific process of music education and teaching in normal universities, there are some deficiencies in the curriculum construction of music major in some normal universities. They fail to make full use of Internet information technology, pay too much attention to students' music level, and pay insufficient attention to cultural literacy, which has caused certain obstacles to the improvement of the quality of music major construction in normal universities. In addition, the status of art education of music majors in some

colleges and universities is higher than that of normal education, and the music professional quality and music teaching ability of music majors in normal colleges and universities cannot be effectively improved. Therefore, in the specific process of music education in normal colleges and universities, music teachers in normal colleges and universities should further enhance their attention to students' cultural education. They should not only care about students' mastery of music knowledge and skills but also pay enough attention to and support the cultivation of students' music teaching ability, so as to ensure the teaching time of professional education and normal education. The teaching arrangement and practice content should be unified, the proportion of technical education and cultural education should be balanced, the professional informatization level should be improved, and the construction quality of music education major in normal colleges and universities and the training quality of music teachers should be improved.

Because "education should aim at cultivating students' independent thinking ability and self-management ability,

and provide students with the skills and abilities needed for future independent learning," independent learning is not only necessary but also very important [1]. The so-called independent learning refers to the teaching process of students in the teacher's inspiration, guidance, and help, through their own exploration of problems, independent participation in the process of solving problems and acquiring knowledge, so as to solve problems and learn to solve problems [2]. Independent learning is a learning behavior and process that takes students as the main body of learning and realizes individual learning goals through its independent analysis, exploration, practice, questioning, and creation. With the popularity of the Internet, independent learning based on the network environment is developing rapidly [3]. Independent learning under the network environment is under the premise of making full use of network advantages, let the students with a strong desire to find problems, solve problems, and urgent mood, using the method of inquiry, independent participation in each course, so as to solve the problem, master the corresponding subject knowledge and various abilities. Independent learning as a learning method is more suitable in the network environment, because the network has a large number of resources needed for research, which helps students to establish a group cooperation mechanism, and can enable teachers to achieve asynchronous guidance [4]. At the same time, we improve the comprehensive ability of students, open up its creation.

The fundamental goal of higher education is to train the innovative talents needed by the country. One of the basic laws that modern higher education must follow is to cultivate students' ability of independent learning, which is suitable for all disciplines of higher education. Music is one of the oldest and most infectious art forms of human beings. As an important form and carrier of human culture, music contains rich cultural and historical connotation, and it has a unique artistic charm. The rich cultural heritage of music art provides a very wide feasibility for students' independent study. After years of practice and exploration, the music education has accumulated some successful experience in the curriculum and teaching. However, due to the influence of the traditional teaching mode, the teaching mode and teaching method of the music education in China still follow the traditional teaching method [5]. To a large extent, teaching methods are limited to what teachers teach and what students learn, and overemphasize on the role of teachers in teaching, thus ignoring the cultivation of students' independent learning ability. Students majoring in senior teacher music have the special dual status of both current students and future teachers. If traditional education methods are used, they will directly affect the learning methods, learning attitude, knowledge structure, and skill structure of generations of educators, resulting in limitations in all aspects. In today's network environment, the independent learning of senior teacher music major students will completely overcome the limitations of traditional music education and traditional learning in space, time, education age, teaching environment, and other aspects, and meet the needs of the society to the greatest extent. The network

environment provides pictures, text, sound, and similar learning signals; helps to develop innovative thinking and divergent thinking, and establish the connection between old and new knowledge; and helps students to master scientific, reasonable, and advanced learning and teaching methods, and lay a good foundation for their study and future work [6].

The curriculum construction and teaching work of music education major in normal colleges and universities need to comply with the development trend of the times; give full play to the advantages of Internet information technology, such as fast transmission speed, wide coverage, and rich information storage; and make effective use of Internet information technology in the process of music curriculum construction in normal colleges and universities. In the specific process of the teaching of music education in normal colleges and universities, the application of Internet information technology is still insufficient. First, the online communication mechanism is not perfect. Some music education majors in normal universities have not established a perfect online communication mechanism, and the communication channels between teachers and students and students are not smooth and timely, which is not conducive to the solution of students' learning problems and the improvement of teachers' teaching process. Second, the use of network music teaching resources is insufficient. Affected by the factors of not advanced equipment and low teachers' information literacy, some teachers did not make full use of information technology to collect, sort out, and use online music teaching resources, which hindered the improvement of the quality of music education courses in normal colleges and the enrichment of students' music knowledge. Finally, the innovation of teaching mode is insufficient. Some teachers have not innovated the teaching mode, but still use the traditional teaching mode. The degree of informatization of the teaching mode is not high, which has caused certain obstacles to the improvement of the music education specialty and the actual teaching quality of the curriculum in normal universities.

2. State of the Art

At present, there is no standardized definition of learning methods, but most scholars believe that learning methods are the means and value direction to achieve learning goals. Through the analysis of the interactive learning between teachers and students, Ai Xueli (Ashley) divides the interaction into three types, namely, student center, knowledge center, and teacher center; there are different types of negotiation, noninterference, and command [7]. The concept of self-directed learning is obviously different from the types proposed above.

Scholar Professor Han Siqing (Hebei Institute of Education Science) believes that independent learning is a concept with relativity and multilevel meaning. Its relativity refers to: first, teachers' control of students and students' learning cannot completely get rid of teachers' control and pursue absolute autonomy; second, compared with "multiple control," students' learning has its internal objective

laws and independent behavior, but their learning is affected by many factors [8]. Students' autonomy in learning is not only manifested in the students' active care and role of the accumulated knowledge and experience to the society but also in the active care and role of the students' mutual relationship between various learning environments and various interactions. On schoolwork study, students should take the initiative to accept the system knowledge and experience, and attaches great importance to observation, experiment, and exploration, or teachers put forward appropriate topic, guide students through certain practical activities (both inside and outside class and social activities) to study, obviously, the meaning of students learning autonomy, and degree is also have level. Independent learning mainly includes three aspects: independent learning consciousness, independent decision making and selection ability, and self-evaluation and self-control ability after the independent completion of learning tasks [9].

Scholar Pang WeiGuo professor of east China normal university thinks that for autonomous learning, it should be defined from two angles: one is from all aspects of learning, if students' learning motivation is self-driven, learning content is oneself, the choice of learning strategy is autonomous regulation, learning time is self-planning and management, students can take the initiative to build learning material and social conditions, and can make self-judgment and evaluation of learning results, and learning is autonomous [10]; another one is from the whole process of learning, if the students can determine their learning goals before learning, learning plan, in the learning of learning progress, learning methods for self-monitoring, self-regulation, after learning to self-check learning results, self-evaluation, and self-summary, and learning is autonomous [11].

To sum up, although domestic and foreign scholars have different definitions and understandings of the concept of independent learning, and have certain truth, and have formed a certain theoretical system, the core of the common point is one to improve the self-awareness of each learning subject. At present, the theory of independent study is influential in the theory is Mr. White et al. [12].

However, relatively speaking, the author thinks that there is a big gap between their definition of independent learning and the realistic independent learning, which belongs to an idealized independent learning. But the core of the common ground is to highlight the autonomous consciousness and autonomous ability of each independent learning subject. It is a kind of learning way; is a lifelong education and build learning society concept of learning way, with relative consciousness, relative independence, relatively personalized, relative effectiveness; can seek positive self-design, self-regulation, self-discovery, self-discovery, self-reflection, self-evaluation of learning strategies, and tendency. It refers to the learning activities with broad thinking and narrow concepts that give full play to the learners' self-awareness and self-ability under the guidance and encouragement of teachers [13].

In addition, the development of music education and teaching in normal colleges and universities needs to make full use of Internet information technology to improve students' music level through the use of online music education resources and the Internet. Therefore, in the specific process of music education in colleges and universities, the following three aspects should be achieved. First, we establish and improve the online communication mechanism. Teachers of music education major courses in normal colleges and universities should give full play to the advantages of the Internet information technology in communication, encourage teachers and students to actively exchange existing problems and puzzles, and further improve students' understanding and mastery of music education knowledge. Second, we make full use of network music teaching resources. Teachers and students of colleges and universities should make full use of Internet teaching resources; give full play to the advantages of the high popularity of mobile network information terminals; encourage students to actively collect and sort out relevant teaching materials in their spare time, preview, and review; and constantly promote the improvement of students' learning ability. Finally, we should innovate the information-based teaching mode. Teachers should fully explore the adaptability of the information-based teaching mode to the music education courses of the university, innovate the teaching mode, improve the information-based level of the teaching mode, and promote the learning efficiency of students in normal colleges and universities.

3. Methodology

3.1. The Characteristics of Autonomous Learning. Independent learning is a process in which learners actively adjust their learning strategies and efforts according to the requirements of their own learning ability and learning tasks. Network independent learning is a new form of learning that learners use computers to surf the Internet and learn independently through the network. Its ultimate goal is to help students cultivate the ability of independent learning and the ability to effectively use various learning strategies, so as to master new knowledge independently under the condition of leaving the classroom. Through reviewing the literature, we found that learning motivation is one of the main reasons affecting students' consciousness of independent learning. Learning motivation is also the internal psychological course that causes and maintains students' learning activities and leads the learning activities to teaching [14]. It includes surface learning motivation, deep learning motivation, and target learning motivation. The surface learning motivation is that students learn music because of external motivation. Therefore, they learn only to meet the minimum standards set by teaching. These students only use mechanical memory as the main learning means in the process of music learning [15]. The deep motivation is that students have an essential and heartfelt interest in music, so they will find their own meaning in music learning. Objective learning motivation refers to a high degree of learning motivation and strong enthusiasm for learning, due to good learning habits, can arrange learning time in a planned and organized way, and try to explore the essential laws and skills of music [16].

Learning motivation and learning are a dialectical relationship, learning can produce motivation, and motivation can promote learning. The effect of independent learning in the network environment depends on the choice of students' learning strategies. Among the many factors affecting the choice of learning strategies, learning motivation is one of the most important factors affecting the choice of learning strategies, which can affect students' choice of learning needs, learning consciousness, learning attitude, and learning interest [17].

In short, the characteristics of independent learning are to give full play to learners' inner potential, cultivate the habit of relatively independent learning, guide learners to develop reasonable learning goals, constantly reflect on their learning process, constantly adjust learning strategies, and constantly develop the ability of independent thinking, the ability to analyze problems, and the ability to solve problems [18].

3.2. Strategy Exploration of Independent Learning Motivation Activation for Students Majoring in Music Education under the Network Environment

3.2.1. Establish a New Teaching Mode Based on the Classroom and the Computer Network. The basic concepts of the new curriculum standard of high normal school music are as follows: take music aesthetics as the core, cultivate interests; pay attention to music practice and enhance creative consciousness; promote folk music; and understand multicultural. As the master machine to train music teachers in primary and secondary colleges, music education majors should also follow the corresponding teaching concepts and actively cultivate innovative and comprehensive music education talents [19]. However, due to the constraints of teaching plan, teaching hours, and other aspects, there are still many deficiencies in paying attention to the development of students' personality and the cultivation of diversified culture. And based on the classroom and computer network, new teaching mode not only can emphasize classroom personalized teaching but also can fully explore students' autonomous learning ability, make the students under the guidance of teachers, according to their own characteristics, level and time, choose the right, interested in learning content, with the help of computer network, quickly improve the music comprehensive application ability, and achieve the best learning effect. The teaching model has three main components: students, teachers, and computer networks [20].

On the whole, this teaching mode has the following two characteristics:

(1) When Students Become the Main Body of Teaching Activities, They Can Adopt Personalized and Independent Learning Methods. Under the guidance of traditional classroom methods, students are allowed to determine their learning goals, learning methods, and learning processes according to their own conditions, learning styles and learning habits; choose appropriate learning content; and, with the help of computer network resources, improve the comprehensive application ability of music to achieve the best learning effect. In some strong theoretical music courses, such as Chinese and foreign music history, teachers can, according to the different situation of students, be divided into several groups, each group of students decorates different teaching tasks: let students in extracurricular using network resources for independent learning, collect relevant learning materials, teachers in the difficulty of the next lesson on the course, make students to have a deeper understanding of interested knowledge, and can summarize. In this way, students can actively think in class, actively participate in the discussion, and gradually find their own learning goals, learning interests, and appropriate learning methods, and cultivate their own awareness of independent learning [21].

(2) Teachers Should Change Their Roles and Build a New Teacher-Student Relationship. In the network teaching environment, teachers must adjust the relationship between themselves and learners, and truly take the "teacher-led, students as the main body." From the original knowledge imparting to resource developers and learning organizers, teachers guide students to carry out independent learning and cooperative learning in the classroom learning, and to help students to complete the construction of meaning in the cooperation [22].

In the choice of classroom content, teachers must change from the disseminator of knowledge to the guide and facilitator of students "learning, so as to help students learn the various knowledge, skills and strategies needed to deal with the challenges, cultivate students" metacognitive ability such as self-planning, self-regulation, and self-evaluation and improve students' independent learning level. In the control of classroom order, teachers must also change from the only controller of the classroom to the collaborator and helper of student activities; organize and supervise the interaction between students and communicate between teachers and students; and constantly encourage students, so that students are full of hope for music learning. And from a single "professional" teachers to "compound" learning researchers, teachers in addition to have professional knowledge and skills and related pedagogy, psychology knowledge, also must master the method of using network technology and basic music software operation skills, and summarize the accumulated experience, to form the understanding of regularity. In this way, as a professional institution of higher learning training, a new generation of teachers, in addition to use oral language and blackboard to impart knowledge information, also good at network-rich network resources, using a variety of information carrier, to scientific, accurate, image, vivid impart knowledge, and transfer all kinds of information, further establishes a new teaching mode based on classroom and computer network [23].

3.2.2. Set Reasonable Learning Goals. The establishment of learning goals means the establishment of a standard of struggle, an intention to obtain some kind of success in learning. Through this standard and intention throughout

the subsequent daily life, it can provide learners with strategies to realize their dreams and goals, avoid students' aimless and directional learning, and realize their life value to the maximum extent [24].

The development of reasonable learning goals for students majoring in music education should be completed with the guidance and help of teachers. Teachers can help them to set their learning goals as both general goals and special goals. The realization of general goals has long-term characteristics, which can be "study hard during college, further study after graduation," "strive for good results," "to be an excellent student," and other goals. Special goals are clear and specific, such as "write a study feeling every week," "listen to a music work every day," and other short-term goals, the general goals need to be implemented through the realization of special goals [25].

For the formulation of special goals, teachers can inform the learning plan of the course at the beginning of the semester course and assign students some after-class thinking questions in each class so that students can acquire knowledge through the network and other means, so as to complete the construction of their own knowledge, stimulate the deep learning motivation, and achieve the expected learning goals.

As for setting general goals, teachers must find out students' unique needs and interests through surveys and individual interviews to help them determine their individual goals. For example, teachers can according to the different characteristics of each student, explore each student's own strengths and advantages, and guide them to establish the idea of subject learning, university learning idea, after graduation life planning, etc. Only under the guidance and help of teachers, students according to their own situation, and strive to implement, can greatly stimulate students' deep learning motivation, improve their interest in learning, to achieve the predetermined personal goals.

3.3. Optimize the Artistic Value Orientation of Music Major in Normal Universities.

The development of curriculum construction and teaching work of music education major in normal colleges and universities is an innovation and improvement of the construction of music education major in normal colleges and universities on the basis of traditional music education. Therefore, the following three aspects should be achieved in the specific construction of music education major and the development of teaching work in normal colleges and universities. First, we carry out aesthetic education. Teachers should pay more attention to students' artistic cultivation and music appreciation ability, and carry out aesthetic education to create an aesthetic atmosphere for students and improve their art appreciation ability. Second, we pay attention to artistic cultivation. Teachers need to pay more attention to students' music perception ability and their inner world, actively guide and guide students' problems, avoid students' utilitarian tendency in the course of music education curriculum construction, help students establish correct professional ethics and values, and promote the improvement and all-round development of students'

professional quality. Finally, we improve the teaching evaluation indicators. Leaders and teachers of normal colleges and universities should further optimize the evaluation mode, combine process evaluation with result evaluation, encourage students to adjust their learning plans and learning methods, guide students to correct their learning attitude, change the one-sided concept of paying too much attention to examination results, and promote the improvement of students' music level and artistic accomplishment.

4. Result Analysis and Discussion

4.1. Analysis of the Current Situation of Music Learning Methods.

The main purpose of the survey is to carry out the corresponding problems of the high music course teaching link and understand the students' music course learning way. Through multiple aspects of the analysis of the higher teacher training colleges, music teaching situation, on the basis of the survey status of relevant suggestions, hopes to help the future music teaching mode change reference, which contributes to the music teaching field in our country.

In order to further ensure the feasibility of the questionnaire, a preliminary test was carried out before issuing the questionnaire, selecting 50 students in the higher teacher training colleges for the preliminary survey, recycling the questionnaire, and carrying out preliminary verification. The reliability coefficient was analyzed by SPSS software, and the main index is a reliability coefficient. From 0.8 to 0.9, the reliability is good; between 0.7 and 0.8 and 0.65~0.7, the questionnaire should be adjusted again. Combined with the preliminary survey results of this survey, corresponding a coefficient of each dimension of the questionnaire is 0.8. The above has verified that the temperature questionnaire is good. In addition, in order to analyze the validity of the questionnaire, a further KMO test was also carried out. The result was 0.870, indicating that the questionnaire had good validity. Later, a formal survey was carried out, and a total of 350 questionnaires were issued, and 325 were recovered, with a recovery rate of 92.8%.

This survey is mainly in the aspect of classroom students' independent experience. According to the survey results, the specific content of the classroom independent learning experience is as shown in Figure 1.

Through the survey and analysis of "in the music class," we can learn that 47% of students noticed "occasionally"; 14% said "often" and 32% said "no." as shown in Figure 2.

Through the survey and analysis of "did the teacher let the students create music or show their understanding of music on stage," we can understand that 39% said "occasional" attention; 21% said "often" and 40% said "no" as shown in Table 1.

It can be seen from Table 1, in music classroom learning, the most popular among students is "learning to sing," followed by "music activities" and "appreciating famous music." The classroom music teaching least popular by students is "music theory knowledge," which may be related to the relatively boring music theory knowledge and students' low interest in learning. The more interested students
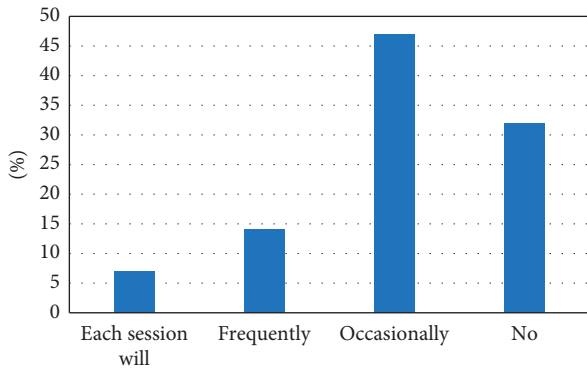
Figure 1: The teacher lets the students feel the music in the music class.
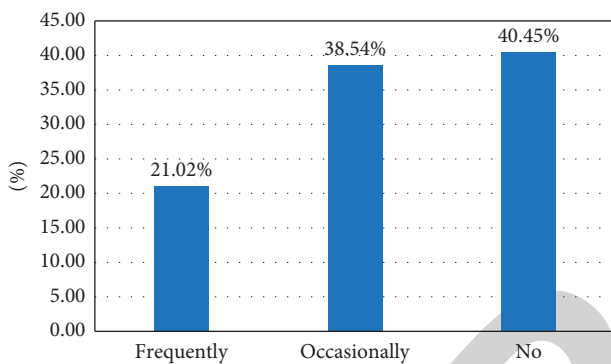
Figure 2: The teacher lets the students feel the music in the music class.

are in the classroom practice, the stronger the experience it will bring to students. Teachers should pay attention to this and carry out more classroom music teaching that students are interested in so that students can better conduct experiential learning.

According to the above survey results, in the process of students' experience learning, occasionally, and not accounted for a large proportion, while the students' experience in the music class was low. In this case, teachers may lack of trust in students in the process of music classroom teaching. In the process of regulating students, flexible measures will lead to too loose classroom discipline management, which leads to poor classroom discipline, affecting the actual effect of high normal school music teaching and students' no sense of participation and experience. So, the teacher should pay attention to the students' experience and emphasize the students' active participation in the music class, it is necessary to stimulate students in music form and music emotional positive experience of association and imagination, the new curriculum also emphasizes the students' aesthetic experience process and emphasizes the value of the music teaching process itself; then, the music classroom will present the dynamic interaction between teachers. Student content and environment thus get rid of simple music learning based on knowledge transfer and skill training, and turning to situational learning of behavioral experience.

4.2. Survey and Analysis of Students' Independent Music Study. The purpose of this survey is to understand the students' interest in music courses, their corresponding abilities, and the active and passive reactions reflected in music learning. The details are shown in Table 2.

To understand students' initiative in music learning, this paper does a survey as shown in Table 3, most of the students are more active and active, more than half of the students can carry out active learning, a few students play only under the supervision of the students' parents, and teachers can better carry out learning.

Using any music from teachers in other subjects, 55% reported "occasional" attention, 23% reported "frequent," and 22% reported "no" as shown in Figure 3.

According to the survey and analysis of whether they have any interest in learning music after class, we can understand that 47% of students said "occasionally," 21% said "regular," and 32% said "no" as shown in Figure 4.

According to the survey "have you heard any course or lecture on music on the Internet," 40% said "occasionally," 18% "regular," and 42% "no" as shown in Figure 5.

According to the above survey results, in the process of students' independent learning, they occasionally do not account for a large proportion, and their interest in independent music learning is weak, most of which belong to passive learning. In this case, passive learning means that students rely too dependent on teachers or others for music learning. During the process of music learning, the objectives, contents, and processes of music learning are determined by the teacher or others. Students have no self-plan and a lack of internal motivation. Obviously, self-learning is a high-quality learning method when compared to passive learning. Therefore, music learning should abandon passive learning methods and choose independent learning methods that can reflect initiative. In music, which is still not the focus of high normal school entrance examinations, interests and hobbies are the main drivers of music learning. Relying on students' interest in learning, self-study is in higher teacher training colleges. For those students who are not very interested in music, they can find their interest points in the network information. In view of the diversified music situation and the continuous innovation and development of music, teachers should actively use students' preferences to guide them to realize the integration of online and offline so that students can achieve the transformation from passive learning to independent learning.

4.3. Investigation and Analysis of Students' Inquiry Study of Music. The survey is mainly to understand whether students have actively explored and thought deeply about music, as well as the learning and communication with music teachers in music. The details are shown in Table 4.

Through the "you know the form of inquiry learning" survey data analysis, we can see the table to understand: more than 70% of the students can independent cooperation and explore, and have a certain understanding of independent inquiry and cooperation to explore this form overall relatively low; more than half of the students have a certain

TABLE 1: Students' favorite music learning experience.

Choice	Knowledge of music theory (%)	Appreciate famous song (%)	To compile a musical composition (%)	Learn to sing (%)	Music activity (%)
Proportion	11.32	38.49	23.89	73.67	51.76

TABLE 2: Students' understanding of music learning objectives.

Choice	Be confident and know your goals clearly (%)	Sometimes I forget my goals. Sometimes I forget my goals (%)	I think a lot, but I do not know how to do it (%)	There is no goal at all (%)
Proportion	31.27	41.73	23.33	3.67

Based on the above survey, 31% shows that the students are more aware of the goals of music courses and how to develop later. Four percent of the students had no learning goals at all, and even understood the learning goals, which would have a certain impact on the analysis of the investigation. Overall, students choose the highest proportion of "sometimes forget their goals" and still have unclear goals for music learning.

TABLE 3: Students take the initiative to learn music when there is no supervision from parents and teachers.

Choice	Be able to learn actively (%)	Sometimes I take the initiative to learn not to control myself, but also forget (%)	I cannot control myself. I just want to play or rest (%)	Never take the initiative to learn (%)
Proportion	43.12	54.55	2.33	0.00

FIGURE 4: Interest in learning music after class.
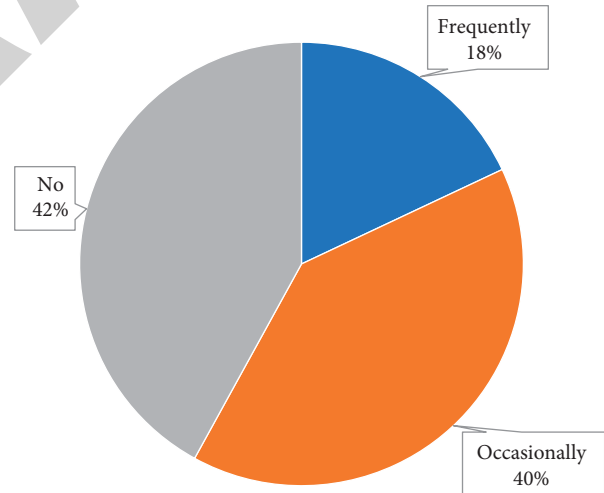
FIGURE 5: Listening to courses or lectures about music on the Internet.

FIGURE 3: Music played to the teachers during the learning process.

degree of understanding and, at the same time, have nearly 20% of the students who understand the corresponding principle; and only a few students do not understand this content. On the whole, most of the students have a certain degree of understanding of inquiry learning, and the most familiar type of learning is independent inquiry, followed by cooperative inquiry, which may be closely related to the type of teacher activities, and may also be related to the hardware facilities provided by the school.

Table 4: Students' knowledge of the form of inquiry learning.

Choice	Independent inquiry (%)	Cooperative research (%)	Probe into the problem (%)	A probe into the theory of music (%)	I do not know (%)
Proportion	76.44	75.04	42.67	19.03	6.66
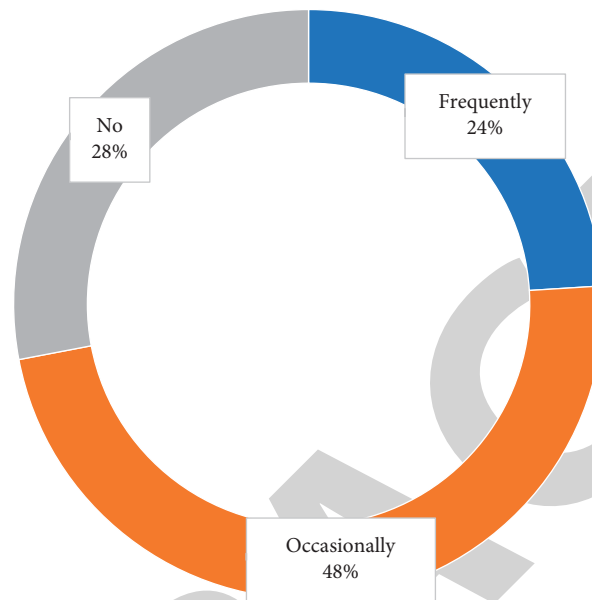
Figure 6: An in-depth analysis of the music.

Through the survey and analysis of the music in the process of listening to music, we can understand that 48% noticed "occasionally," 24% said "often," and 28% said "no" as shown in Figure 6.

From the above survey results, in the process of students' learning and exploration, occasionally and not a large proportion, the music exploration and communication with teachers are rare. In this case, students should be encouraged to explore themselves, group cooperation, ask questions, collect information, and complete the query process through communication. Compared with inquiry learning, acceptance learning is mainly through teacher teaching or demonstration, as well as students' listening or watching. The content of music learning is presented in a clear way.

5. Conclusion

We establish appropriate independent learning objectives to enhance students' motivation and learning fun; develop effective independent learning plan to further standardize student learning and achieve goals quickly; use good learning strategies, answer questions; guide students to use the network reasonably, continuously strengthen self-protection consciousness; and teach students to learn self-evaluation and accumulate learning experience. To sum up, only then, the students can better carry out autonomous learning in the network environment.

Although the research of independent music learning has formed a certain situation, the systematic research based on independent learning of higher vocational music in China is still lagging behind. Therefore, many aspects of this topic in the field of independent higher vocational music learning and research are only made superficial exploration, which is the so-called stone to ask the way, and cross the river by feeling the stone. For example, ① it has a weak research on independent evaluation mechanism and offers some opinions, but still far from the practical operation; ② it combines independent learning classroom with extracurricular teaching activities enough; ③ it supports the rationality of music aesthetics, music philosophy, and music psychology. In the future, we can try to combine the independent evaluation mechanism mentioned in this paper and the goal of combining independent learning classroom with extracurricular teaching activities through offline ways.

Data Availability

The labeled dataset used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

Hindawi

Research Article

Reform and Analysis of the Division of Legal Responsibility between Enterprises and Third-Party Governance under Environmental Pollution

Yijun Wu [iD]

School of Law, Anhui University, Hefei, Anhui 230000, China

Correspondence should be addressed to Yijun Wu; k20101002@stu.ahu.edu.cn

This paper aims to deeply analyze the relevant concepts of the third-party responsibility for environmental pollution control of enterprises and further clarify the legal responsibility and responsibility distribution of the third-party environmental pollution control. Through the analysis of enterprise environmental pollution sample data, this paper finds that the judicial application of enterprise environmental pollution crime in China mainly includes the number of cases increases year by year and the subjects of enterprise environmental pollution crime are relatively concentrated. The results show that the joint crime accounts for about 40%, and unit crime cases account for about 10%, while the amount of fines for natural persons in the existing laws is mostly less than 50,000 yuan, which is relatively low. Finally, it is concluded that the criminal punishment of enterprise environmental pollution is relatively light, especially in the accountability of the criminal subject. Therefore, this paper focuses on the division of legal liability from three aspects: civil liability, administrative liability, and criminal liability.

1. Introduction

In recent years, with the intensification of environmental problems, the third-party governance of environmental pollution has received extensive attention. Based on the traditional "who pollutes, who governs" model and principle, it is difficult for the subject of environmental pollution to achieve efficient environmental governance due to the lack of pollution control ability and technical defects [1]. Although the government undertakes the main responsibility of environmental governance in the public sphere in the process of environmental governance, it is unable to make scientific decisions due to the lack of professional pollution control talents and scientific management means. The transformation of the third-party governance mode of enterprise environmental pollution is directly related to the promotion of national policies. However, due to the fact that the national case responsibility in this regard has not been clearly clarified, the distribution of responsibility for the third-party governance is not clear enough, especially the

internal responsibility defects have caused some obstacles to the third-party governance. Therefore, aiming at the existing problems, this paper focuses on the definition of the third-party governance responsibility in enterprise environmental pollution from the legal level. See Figure 1.

2. Literature Review

In terms of the legal background of environmental governance abroad, some developed countries will not only stipulate the responsibilities and obligations of governments, enterprises, social organizations, and citizens at all levels by issuing relevant laws but also encourage enterprises to entrust the pollution control work to licensed professional environmental service companies, which provides a guarantee for the marketization of environmental protection industry. In practice, according to relevant laws and regulations, a strict review and licensing system for pollution control enterprises is implemented, and different pollutant treatment practitioners need to go through different levels of
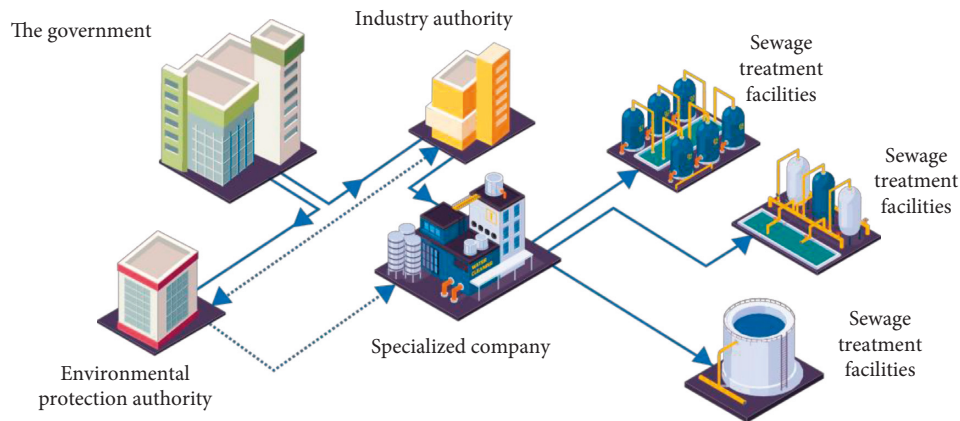
Figure 1: Problems faced by enterprises and third-party governance under environmental pollution.

qualification review and certification processes. In addition, the law focuses on the discharger's responsibility and extended producer's responsibility. The discharger is responsible for the discharged industrial waste, and the producer is responsible for the pollution generated in the whole life cycle of the product. If the regulations are violated, the local governor can exercise the power of supervision and inspection to punish them. In the third-party governance model of enterprise environmental pollution, how to allocate legal responsibility has become the focus of theoretical and practical circles [2, 3]. At present, there are mainly the following four views:

First, it advocates that the responsibility should be borne by the pollutant discharge enterprise, that is, if the discharge still fails to meet the standard after being treated by a third party, the pollutant discharge enterprise should bear the corresponding legal responsibility independently, and the third party should not bear the responsibility.

Second, it advocates that the third party should bear the responsibility, that is, the environmental service company should bear the corresponding legal responsibility if the discharge still fails to meet the standard after being treated by the third party.

Third, it advocates to assume responsibility according to the agreement, that is, the responsibility should be defined according to the specific content of the contract signed between the pollutant discharge enterprise and the third party, the mode of cooperation, and the degree of fault in the performance of the contract. In short, those who breach the contract will bear the responsibility; for example, scholars have proposed that if the third party strictly performs the contract, but the pollutant discharge enterprise discharges excessive pollutants or commits other acts in violation of the terms of the contract, the pollutant discharge enterprise should bear the responsibility.

Fourth, it advocates that the responsibilities should be determined according to the comprehensive situation. Some scholars propose that the modes of "entrusted governance service" and "entrusted operation service" should be distinguished to determine the primary and secondary responsibilities. Some scholars divide the third-party governance model of "enterprise cooperation" into independent and embedded types and determine the commitment of environmental tort liability respectively according to the fault of sewage enterprises and third-party governance [4, 5].

3. Legislative Evolution of Environmental Pollution Crime

Since the eighth punishment, the crime of polluting the environment has officially replaced the previous crime, opening a new era of environmental crime control. The crime of polluting the environment, which has been revised since the Eleventh Amendment to the criminal law, is no longer a minor crime in the early days of its establishment, but a felony [6]. At the same time of the crime of polluting the environment, if a heavier crime is committed, such as the crime of putting dangerous substances, the crime can be sentenced to death at most, which enhances the deterrence of the crime of polluting the environment. Therefore, the newly revised crime of polluting the environment improves the current situation of low sentencing of the crime of polluting the environment and increases the punishment of the crime of polluting the environment. See Tables 1 and 2.

4. Sample Analysis of Judicial Application Cases of Environmental Pollution Crime

4.1. Sample. Based on this explanation, relevant departments continued to maintain a high pressure on environmental pollution crimes, resolutely punished corresponding criminal activities, and achieved good social results. The author searched the two key words of criminal cases and environmental pollution crime on the judgment document network and found a total of 16,140 documents, covering 31 provinces and cities and a construction corps (see Table 3).

It can be seen from the above table that among the 16,140 documents retrieved on the judgment document network, 12,698 were first instance by the grassroots courts and 55 were first instance by the intermediate courts. Generally speaking, the cases involving the crime of environmental pollution are of great social harm and deserve attention; for

TABLE 1: Comparison between "major pollution crime" and "environmental pollution crime."

	Charge	Range of pollutants	Lower threshold of conviction	Object expansion	Immediate standard
97 Criminal Law	Crime of major environmental pollution accident	"Radioactive other hazardous waste"	"Causing major environmental pollution, casualties, and serious consequences"	"Disposal to land and water"	"Major property losses or personal casualties"
Criminal Law Amendment VIII	Crime of environmental pollution	Replace "other hazardous wastes" with "other hazardous substances"	"Seriously polluting the environment"	Cancel the list of objects and replace it with "violation of national regulations"	Serious environmental pollution

TABLE 2: Comparison of environmental pollution crime and penalty between "Criminal Law Amendment 8" and "Criminal Law Amendment 11."

	Legal punishment grade	Maximum sentence	Determination of the circumstances of "fixed-term imprisonment of not less than three years but not more than seven years"	When competing with other crimes
Criminal Law Amendment VIII	Grade 2 "serious environmental pollution" and "especially serious consequences"	If the consequences are especially serious, he shall be sentenced to fixed-term imprisonment of up to seven years	The consequences are particularly serious	Nothing
Criminal Law Amendment 11	Grade 3 "serious environmental pollution," "serious circumstances," "four felony cases applicable to a prison term of more than seven years"	Under any of the following four circumstances, the maximum term of imprisonment is 15 years	Serious circumstances	Be convicted and punished in accordance with the provisions on heavier punishment

TABLE 3: Sample data of environmental pollution crime cases from 2015 to 2021.

Grassroots court		Intermediate court		High court	
12,699		3389		30	
		Trial procedure			
First instance	Second instance	Trial supervision	Penalty and execution change		Other
12,754	2458	114	814		4
		Text type			
Judgment	Ruling	Conciliation statement	Decision		Notice
12,778	3187	7	81		88

example, the Tengger Desert pollution case eventually caused ecological losses, and the contaminated soil area was about 120,000 square meters, about 180 mu. Finally, the eight enterprises involved shared the repair cost of 560 million yuan. Although there are few such cases, the impact is unprecedented and needs our attention [7–9].

It can be seen from Figure 2 that the number of criminal cases of environmental pollution crime has increased significantly since the implementation of the "13 interpretation." It was not until 2017 that the number of environmental pollution crime cases closed reached a breakthrough from single digits to ten digits, with 39 cases. In 2018, the number of environmental pollution crime cases closed reached 944, showing an explosive growth. Until the end of 2020, the number of closed cases began to show a downward trend [10]. By the end of 2020, the number of closed criminal cases of environmental pollution crime had

reached 2672. It can be seen that the number of criminal cases of environmental pollution in China has generally increased in recent years.

Taking a province as an example, according to the statistics of the criminal judgments of the first instance of the crime of environmental pollution from 2015 to 2021, it can be seen that the number of cases of the crime of environmental pollution in a province has increased in multiples since 2015, but it can be seen that although the number of cases is still increasing every year since 2016, the growth rate shows a downward trend compared with previous years. This is because, in recent years, the problem of environmental pollution has become more and more serious, which has attracted the great attention of the government and relevant departments. The efforts to crack down on environmental pollution crimes have increased and achieved certain results. See Table 4.
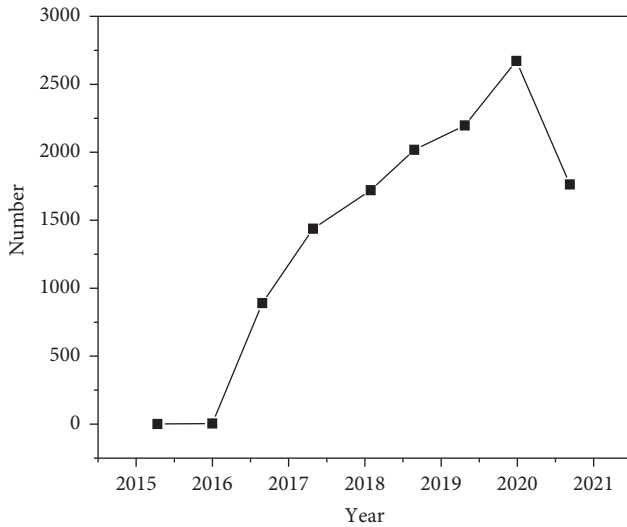
FIGURE 2: Statistics on the number of environmental pollution crime cases concluded by courts at all levels in the first instance from 2015 to 2021.

FIGURE 3: Number of environmental pollution crime cases concluded by courts at all levels of a province in the first instance from 2015 to 2021.

TABLE 4: Number of first instance cases of "environmental pollution crime" in a province from 2015 to 2021.

Particular year	2015	2016	2017	2018	2019	2020	2021
	20	461	506	414	245	201	188

4.2. Sample Data Analysis. From 2015 to 2018, due to the increased crackdown and supervision, the number of criminal judicial judgments on environmental pollution crimes also increased year by year, reaching a peak in 2015. After 2018, the environmental pollution of a province has been effectively controlled, the environmental protection situation has developed well, and the environmental protection policy has achieved certain results. See Figure 3.

The data change in Figure 3 fully shows that the judicial interpretation issued in the original legislative package has provided obvious help for the judicial organs to hear cases, which has rekindled the backlog of "trial passion." In addition, the provincial party committee and the provincial government responded to the national call and put forward guidelines and measures for comprehensive environmental treatment, especially the supervision of water pollution, which also led to the surge in the number of cases. It can be seen that the increase in the number is the embodiment of the local government's attention to environmental protection [11–13].

As can be seen from Table 5, showing the basic situation of the application of freedom punishment in the cases of environmental pollution crime in a province from 2015 to 2021, after the establishment of the crime of environmental pollution, most of the penalties are concentrated in fixed-term imprisonment of less than 3 years, accounting for 60%; however, after 2018, it can be seen that among the number of people sentenced to freedom punishment, the number of suspended sentences has increased significantly, compared with the number of people sentenced to more than one year and less than three years [14]. See Figure 4.
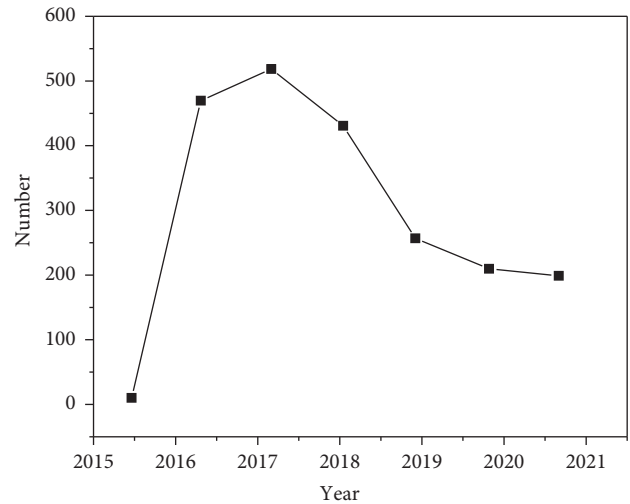
In the 2099 cases, there were 815 cases of joint crime. Nearly 40% of the cases occurred in places where individuals illegally operated. Most environmental pollution cases were for the purpose of seeking benefits. Criminal acts need the cooperation of multiple people and division of labor; therefore, the majority of environmental pollution crimes are joint crimes. See Figure 5.

Among the 2099 judgments of first instance, there were 1894 natural person crimes, accounting for 90% of the total, 205 unit crimes, and accounting for 10% of the total, 12 people were exempted from criminal punishment. The number of people sentenced to probation, criminal detention, and fixed-term imprisonment of not more than three years was 3847, accounting for 97.6% of the total. Among them, 1393 were suspended, accounting for 35.3% of the total; 2093 people were sentenced to fixed-term imprisonment of less than three years, accounting for 53.1%. In comparison, the number of people exempted from punishment, single penalty, and fixed-term imprisonment of more than 3 years and less than 7 years is relatively small, of which 59 people are sentenced to fixed-term imprisonment of more than 3 years and less than 7 years, accounting for 1.5% of the total. 12 people were exempted from criminal punishment, accounting for 0.3% of the total. 23 people were fined only, accounting for 0.6% of the total. In judicial practice, the sentencing of most defendants of environmental pollution crime is relatively light (see Figure 6).

In terms of the types of criminal subjects, natural persons account for 90% of the subjects of environmental pollution crimes, and unit subjects account for only 10%. The subjects of environmental pollution crimes are mainly private workshops that conduct industrial processing and production privately or in violation of national regulations (see Figure 7).

As shown in Table 6, 80% of natural persons were fined less than 50000 yuan, accounting for 80.2% of the total number. Fines ranging from 50,000 yuan to 100,000 yuan

TABLE 5: Number of natural persons punished for environmental pollution crimes concluded by courts at all levels of a province in the first instance from 2015 to 2021.

Particular year	Exemption from punishment	Single penalty	Probation	Criminal detention	3–7 years	Total
2015	0	0	3	17	2	22
2016	0	3	172	502	20	697
2017	2	1	251	501	8	763
2018	3	5	322	376	1	707
2019	4	5	184	176	7	385
2020	0	3	178	143	16	340
2021	0	1	217	131	20	369
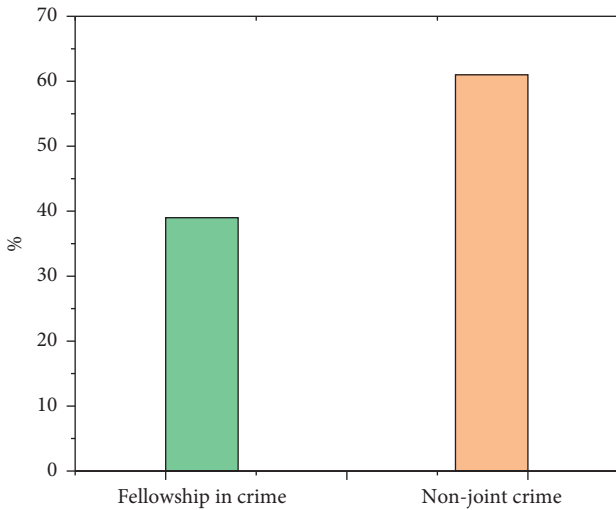
FIGURE 4: Joint crime and non-joint crime of environmental pollution crime concluded by courts at all levels of a province in the first instance from 2015 to 2021.
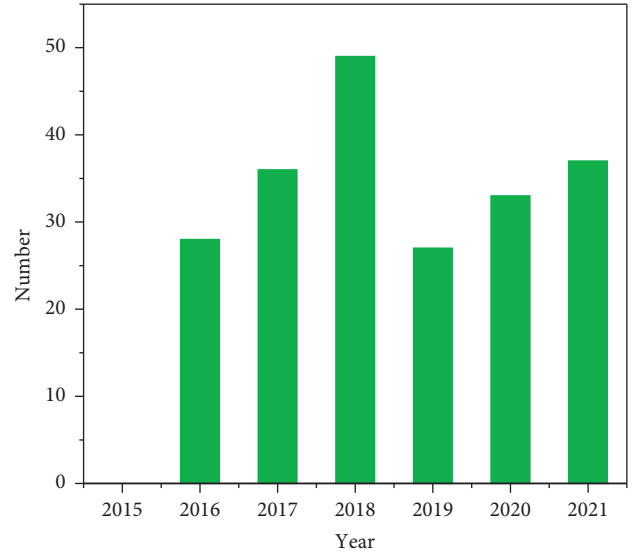
FIGURE 6: Number of crimes committed by environmental pollution crime units concluded by courts at all levels of a province in the first instance from 2015 to 2021.
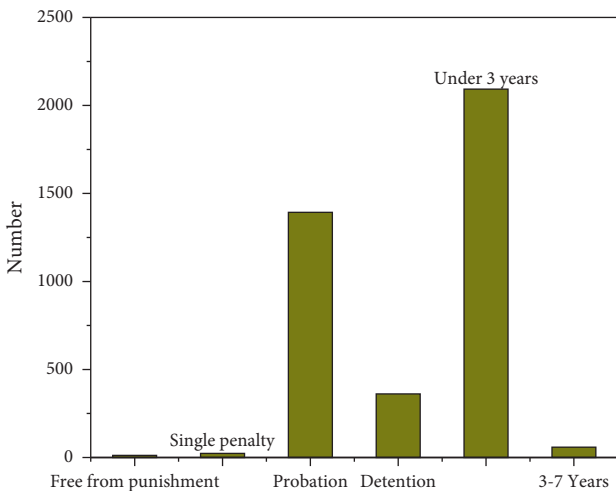
FIGURE 5: Punishment of environmental pollution crime concluded by courts at all levels of a province in the first instance from 2015 to 2021.
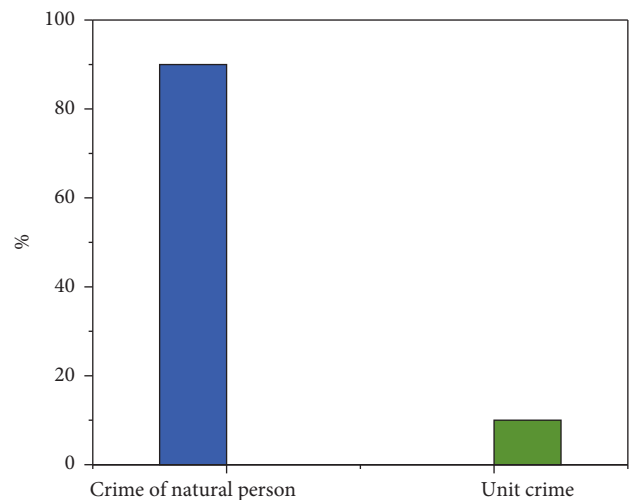
FIGURE 7: Subjects of environmental pollution crimes concluded by courts at all levels of a province in the first instance from 2015 to 2021.

accounted for 12.5% of the total number. In 2017, four defendants were fined more than 1 million yuan, and the highest was fined 3 million yuan. Among the accomplices, two defendants were fined 3 million yuan and one was fined 1.5 million yuan, which is a relatively high amount compared with other cases. However, generally speaking, the amount of fines for natural persons is relatively light [15–17].

TABLE 6: Number of natural person fines for environmental pollution crimes concluded by courts at all levels of a province in the first instance from 2015 to 2021.

Particular year	Less than 5	5–10	10–20	20–50	50–100	More than 100
2015	22	3	0	0	0	0
2016	736	30	32	3	0	0
2017	727	134	57	5	1	4
2018	626	90	53	8	0	0
2019	374	47	4	4	1	0
2020	312	45	32	6	0	0
2021	271	76	33	6	2	0

As shown in Table 7, compared with natural person crimes, unit crimes account for only 10% of the total number of crimes, that is, 205 cases. However, in terms of the amount of fines, unit crimes are sentenced to more fines. 50 pieces less than 50,000 yuan; 71 pieces of RMB 50,000–150,000; 46 pieces of RMB 150,000–500,000; 11 pieces of RMB 500,000–1 million; 5 pieces of RMB 1–10 million; and for the two cases exceeding 10 million yuan, one was fined 18.5 million yuan and the other was fined 63 million yuan. There is a clear gap in the amount of fines for 17 unit crimes, most of which are concentrated below 500,000 yuan. Before 2019, most of the unit fines will be less than 150,000 yuan. After 2020, the penalty for units will increase [18, 19].

4.3. Cause Analysis. Of the total number of cases, the number of probation cases was up to 1049, accounting for about 49%. Probation cases are mostly concentrated in one year and six months a year, with a total of 713 cases. A total of 1393 people were sentenced to probation. The application of probation is different in the same province. At the same time, there is also uneven sentencing. Just like the three cases mentioned above, the pollution sources are generally the same or light, but the penalties are different. Some are applicable to probation, and some are not applicable [20]. See Table 8 for details.

As can be seen from Table 8, the first six items have legal commutation and discretionary commutation, and the last item can increase the sentence on the basis of the original sentence. These circumstances are the factors leading to the discretion of the judge. For the director of unit crime, if he is sentenced to fixed-term imprisonment, it may have a certain impact on the enterprise and local economy. The local government is under pressure to solve the employment problem of employees and the fluctuation of local finance. Under the influence of local protectionism, the government will intervene in the administration of justice, and the person in charge will also propose to pay more fines in exchange for the opportunity of probation [21–23].

5. Division of Responsibility for the Third-Party Treatment of Environmental Pollution of Enterprises

Due to the emergence of the third-party governance, the situation of single responsibility subject in the traditional model is broken, which makes the legal relationship of the third-party governance complex. The main characteristics are as follows: first, the diversification of responsibility subjects. In the traditional model, the subject of legal responsibility is only the sewage enterprises, while in the legal responsibility of third-party governance, the subject of responsibility includes sewage enterprises and environmental service companies [24]. Second, the sources of obligations of the subject of responsibility are different. The obligation of environmental service companies to treat the pollutants discharged by pollutant discharge enterprises comes from the contract between both parties and belongs to private law obligations. Third, the principle of responsibility has changed. Figures 8 and 9 show the legal relationship of environmental pollution control.

The third-party treatment contract of environmental pollution of the enterprise stipulates that the performance of the contract focuses on the pollution treatment process. The pollutant discharge enterprise fully trusts the environmental service company, and the payment of remuneration is not conditional on the third party achieving the expected effect of pollution treatment, then the rules of the entrustment contract can be applied to the contract. If the contract stipulates that the remuneration will be paid only when a certain governance effect is achieved, the rules of contract for work shall apply.

5.1. Division of Civil Liability. The division of civil liability can implement the governance mode of entrusting a third party to operate.

In the entrusted governance model, pollutant discharge enterprises have ownership and control over pollution production equipment, pollution control equipment, and pollutants. According to whether there is fault between the pollutant discharge enterprise and the environmental service company, it can be divided into the following five situations:

First, the pollutant discharge enterprise and the environmental service company have common faults, which constitute joint infringement. It is generally believed that joint tort can include joint negligence, not limited to joint intention. As joint infringement produces joint and several liability, both parties shall bear joint and several liability for compensation.

Second, both sewage enterprises and environmental service companies have faults for environmental infringement, but they do not belong to common faults. Since the pollutant discharge enterprises have the ownership and control over the pollution production equipment and pollution control equipment, and the pollutant discharge

TABLE 7: Fines of environmental pollution crime units concluded by courts at all levels of a province in the first instance from 2015 to 2021.

| Particular year	Less than 5	5–15	15–50	50–100	100–1000	More than 1000
2015	0	0	0	0	0	0
2016	9	12	2	1	0	1
2017	4	13	11	1	2	1
2018	16	20	4	3	1	0
2019	12	7	3	1	1	0
2020	6	9	12	2	0	0
2021	3	10	14	5	1	0

TABLE 8: Application of sentencing circumstances of environmental pollution crime concluded by courts at all levels of a province in the first instance from 2015 to 2021.

	Sentencing circumstances	Number of cases	Case number
1	Confess	153	(2013) Jin Pu criminal procedure of first instance No. 765, etc
2	Render meritorious service	64	(2014) Jin Pu criminal procedure of first instance No. 187, etc
3	Surrender oneself	604	(2014) Yu Yu criminal procedure of first instance No. 151, etc
4	Accessory	369	(2015) Wen Le criminal procedure of first instance No. 1573, etc
5	First offense, incidental offense	99	(2015) Tai Lu criminal procedure of first instance No. 271, etc
6	Pay environmental remediation fee	35	(2019) Zhe 0602 criminal procedure of first instance No. 1172, etc
7	Recidivism	26	(2015) Wen Le criminal procedure of first instance No. 959, etc
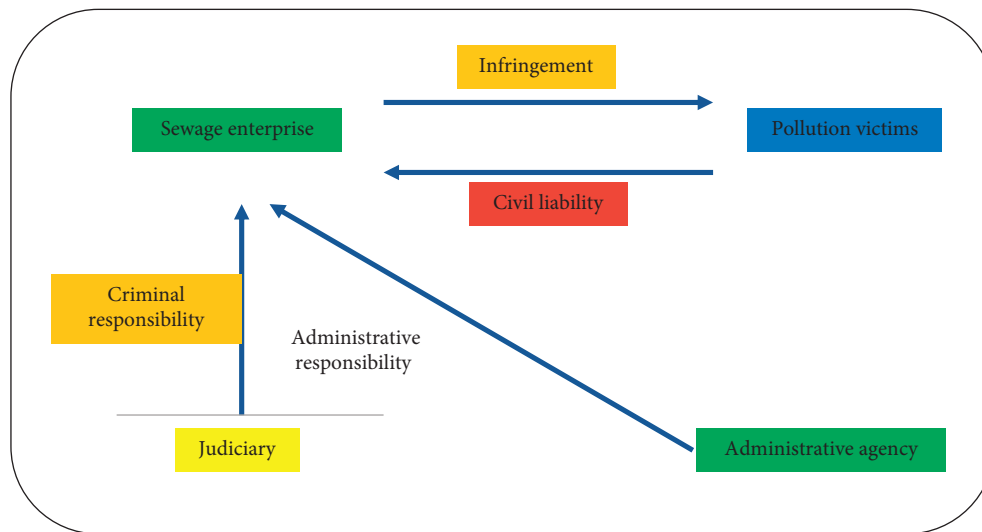
FIGURE 8: Legal relationship of traditional environmental pollution control.

enterprises are responsible for the pollution discharge behavior, the pollutant discharge enterprises shall bear the environmental tort liability alone. However, bearing the tort liability does not affect the investigation of the liability for breach of contract. After assuming the tort liability, the pollutant discharge enterprise can recover the damage caused by the breach of contract of the environmental service company.

Third, the sewage enterprises and environmental service companies are not at fault. Because the principle of no fault liability is applicable to environmental tort, regardless of the perpetrator's illegality and subjective fault, up to standard discharge and no fault cannot become the exemption cause of environmental pollution liability, and the polluter still has to bear tort liability. In other words, when the pollutant discharge enterprises and environmental service companies

fulfill their respective obligations according to the contract and achieve up to standard discharge, but still cause environmental pollution damage, the polluter shall still bear the responsibility. Since the pollutant discharge enterprise has the ownership and control over the pollution production equipment and pollution control equipment, and has implemented the pollutant discharge behavior, the polluter should be the pollutant discharge enterprise, and the pollutant discharge enterprise should bear the tort liability [25].

Fourth, the pollutant discharge enterprise is at fault, and the environmental service company is not at fault. The environmental service company provides treatment services according to the contract, but the pollutant discharge enterprise does not discharge the type, concentration, and quantity of pollutants according to the contract, resulting in damage. At this time, there is a causal relationship between
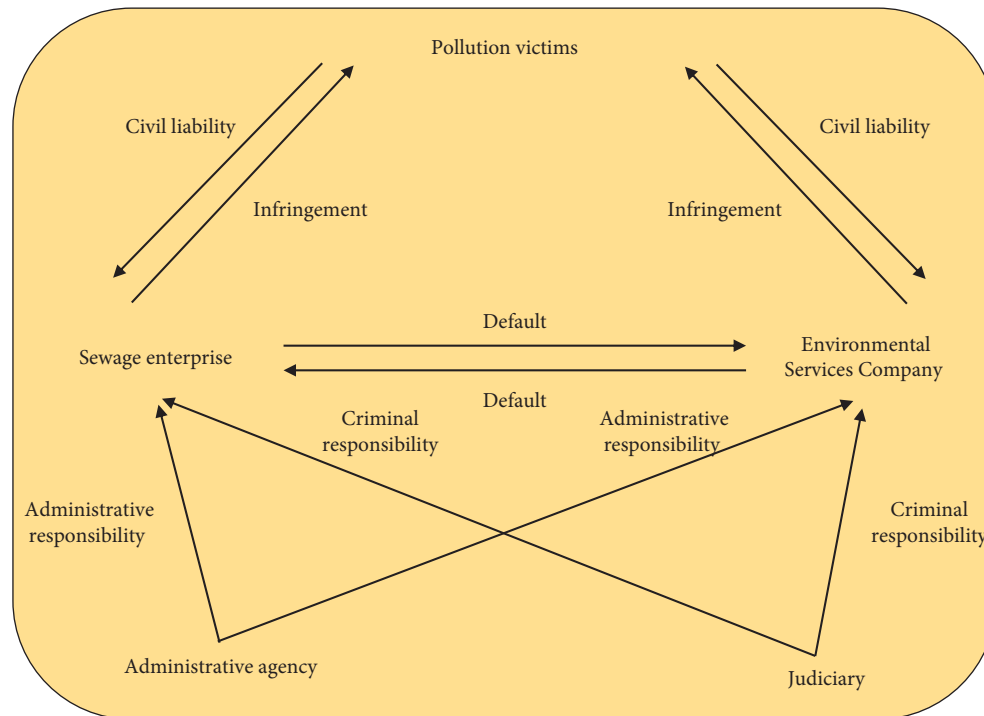
FIGURE 9: Legal relationship of third-party treatment of environmental pollution of enterprises.

the behavior of the pollutant discharge enterprise and the damage results, and the pollutant discharge enterprise has the ownership and control over the pollution production equipment and pollution control equipment, so the pollutant discharge enterprise should bear the environmental tort liability.

Fifth, the pollutant discharge enterprises are not at fault, and the environmental service companies are at fault; for example, the pollutant discharge enterprises discharge pollutants according to the types, concentrations, and quantities of pollutants agreed in the contract, but the environmental service companies do not operate the pollution control equipment normally in the process of pollution control and illegally discharge pollutants, resulting in damage consequences. Since the pollutant discharge enterprises have the ownership and control over the pollution production equipment and pollution control equipment, and learn from the environmental equipment liability theory, the pollutant discharge enterprises shall bear the environmental tort liability. After assuming the tort liability, the pollutant discharge enterprise has the right to request the environmental service company to bear the corresponding liability for breach of contract in accordance with the environmental service contract signed by both parties.

5.2. Division of Administrative Responsibility

5.2.1. Division of Responsibilities in Entrusted Operation Third-Party Governance. In the commissioned third-party treatment, as the manufacturer of pollution sources, the pollutant discharge enterprise must be the supervision object of the competent administrative department, and the

pollutant discharge enterprise has the ownership and control over the pollution treatment equipment and pollutants. Therefore, even for the reasons of environmental service companies, the pollutant discharge enterprise should also bear administrative responsibility. For the environmental service company, it mainly sends technicians to settle in the sewage discharge enterprise, manage the sewage treatment equipment, and treat the pollutants. Therefore, the environmental service company does not have external independence and will not bear administrative responsibility in case of illegal sewage discharge. However, if the illegal sewage discharge is caused by the environmental service company's laziness in governance or illegal breach of contract, the sewage discharge enterprise can recover from it after taking responsibility as a "polluter."

5.2.2. Division of Responsibilities in Building Operational Third-Party Governance. In the construction and operation of third-party governance, pollutant discharge enterprises are still the manufacturers of pollution sources, which is obviously the supervision object of the competent environmental administrative department. Since environmental service companies enjoy pollution control equipment and have the right to control and dominate pollutants, and they are also the main body that ultimately discharges pollutants to nature, they can be included in the scope of "enterprises and institutions discharging pollutants" stipulated by law by expanding the interpretation of "polluters" and become the supervision object of the competent environmental administrative department. The division of administrative responsibility for the construction of operational third-party governance needs to divide the responsibilities of both

parties according to the main reasons that lead to the failure to complete the governance task.

First, if the pollution discharge enterprise and the environmental service company are caused by common reasons, both parties shall bear corresponding administrative responsibilities. Common reasons include illegal discharge of pollutants after negotiation by both parties or similar situations such as excessive discharge of pollutants caused by the operation failure of pollution control equipment when the environmental service company is treating pollutants due to the failure of pollutant treatment equipment. At this time, the competent department of ecological environment shall punish both parties in accordance with the environmental administrative laws and regulations.

Second, only for the reasons of pollutant discharge enterprises, the polluters should bear the administrative and legal responsibility for illegal pollutant discharge; for example, the environmental service company cannot complete the treatment task because the pollutant discharge enterprise does not discharge the type and quantity of pollutants according to the contract. The reasons are as follows: first, whether independent or embedded, both sides can implement pollution discharge behavior relatively independently; and second, the premise for the transfer of pollution control responsibility of pollutant discharge enterprises is that their own production and operation behavior is legal, and the quantity, concentration, and other indicators of pollutants delivered to environmental service companies comply with legal provisions and contract agreements. Therefore, at this time, pollutant discharge enterprises should bear the administrative and legal responsibility for illegal pollutant discharge and bear the corresponding liability for breach of contract to environmental service companies.

Third, only for the reason of environmental service company, the environmental service company shall bear the administrative responsibility. The pollutant discharge enterprise carefully selects a qualified environmental service company and discharges pollutants according to the contract. However, if the environmental service company fails to complete the treatment task due to the fault of the pollution treatment equipment or staff of the environmental service company, the environmental service company shall bear the corresponding administrative responsibility; if the environmental service company breaches the contract to the pollutant discharge enterprise, it shall bear the corresponding liability for breach of contract at the same time. The government should speed up the construction of the credit rating system of environmental service companies, which is conducive to judging whether the pollutant discharge enterprises have fulfilled their duty of prudence.

5.3. Division of Criminal Responsibility. For the environmental criminal responsibility of the third-party treatment of environmental pollution of enterprises, this paper will no longer distinguish between the entrusted operation mode and the construction operation mode. Because the ownership and control of pollutants and their production equipment do not affect the establishment of the crime of environmental pollution, the identification of the criminal responsibility of sewage enterprises and third parties depends on whether they meet the constitutive elements of the crime of environmental pollution. However, the subjective elements of the crime of polluting the environment are still controversial. The author believes that the principle of legality should be strictly followed, and negligence cannot constitute the crime of polluting the environment. For the negligent discharge of pollutants by pollutant discharge enterprises or environmental service companies, which has caused serious consequences, civil compensation and administrative punishment cannot achieve the purpose of punishment. Illegal pollutant discharge substances can be identified as toxic substances in dangerous substances, and criminals can be punished through the crime of negligent release of dangerous substances.

In the third-party governance model of enterprise environmental pollution, the subjects constituting the crime of environmental pollution include sewage enterprises and their supervisors, directly responsible personnel, environmental service companies and their supervisors and directly responsible personnel. Since the number of people involved may be large, the principle of legality must be strictly observed to ensure fairness and justice. Neutral duty behavior can be the obstruction of the objective elements of the crime. However, as long as the behavior is not implemented by following the arrangement of the leader, it is a neutral job behavior, which should be analyzed in combination with its own work content. In addition, it is worth mentioning that in order to encourage the subject of responsibility to repair the ecological environment, the law stipulates that the active implementation of civil compensation and administrative fines will be conducive to the sentencing of the crime of environmental pollution. The starting point of this provision is good, but we should be careful that "replacing punishment with punishment" will affect judicial fairness.

In the third-party treatment mode of enterprise environmental pollution, if both parties jointly deliberately commit the criminal act, the pollutant discharge enterprise and its supervisors, the persons directly responsible and the environmental service company and its supervisors, and persons directly responsible shall be recognized as joint crimes, the pollutant discharge enterprise and the environmental service company shall be fined, and their supervisors and persons directly responsible shall be punished in accordance with the provisions of natural persons committing the crime. If one party of a pollutant discharge enterprise or environmental service company knows the other party's criminal act and still provides convenience for the other party, it can be identified as a one-sided accomplice and punished according to the former situation. If there is no evidence to prove that the pollutant discharge enterprise and the environmental service company constitute joint intention, if the environmental service company has committed the criminal act, the environmental service company and its supervisors and directly responsible personnel shall bear criminal responsibility; and if the environmental service company is not aware of the criminal act committed by the pollutant discharge enterprise, the pollutant discharge

enterprise and its supervisors and directly responsible personnel shall bear criminal responsibility.

6. Conclusion

Since the crime of environmental pollution is a double punishment system, the unit can also constitute the crime. According to the statistical table of unit crime, out of a total of 2099 judgments, there are only 205 cases involving unit crime, accounting for 10% of the total, and the remaining natural person crimes account for 90%. The units of environmental pollution administrative punishment cases account for a large proportion, reaching about 91%. Through the research, it is found that an important condition for the establishment of unit crime is that the criminal act must reflect the will of the unit. However, the definition of unit will is vague, and there is no explicit legislation, but this identification is handed over to the theoretical and practical circles. In this case, the court held that the defendant illegally discharged sewage according to his personal will and did not reflect the will of the unit. Only one defendant was sentenced to fixed-term imprisonment, and the other two defendants were sentenced to probation. It is generally believed that the first consideration is whether the pollution discharge behavior has undergone the collective research and decision-making of the unit or the decision of the person directly in charge because if the behavior is not the case, it must not be a unit crime. But sometimes superficial does not necessarily reflect the will of the unit. In the process of performing tasks, employees may often hand over hazardous wastes to enterprises without waste treatment qualification to improve efficiency and profits, but it is uncertain whether this is the will of the unit; whether it can also be recognized as the interests of the unit that senior executives use the unit's vehicles to help their friends deal with hazardous waste for the sake of human relations is controversial.

However, the development of the third-party governance model of enterprise environmental pollution has injected vitality into the industrial market, enabling enterprises to control pollutants efficiently and at low cost and narrowing the governance responsibility and supervision scope of the government. Therefore, the central and local governments have vigorously promoted the third-party governance model of environmental pollution. However, due to the novelty of this model, there is no systematic provision in China's existing legal system, resulting in a cluster of problems in judicial practice. Therefore, we must further clarify the division of legal liability for environmental pollution. In addition to studying the legal liability of third-party governance of environmental pollution of enterprises, how to reduce the risk of loss caused by environmental pollution and reduce the cost of pollution governance is another issue worthy of discussion.

The environmental service market can further explore the construction of environmental liability insurance system and the establishment of damage compensation foundation for environmental service enterprises, so as to improve the anti-risk ability of pollutant discharge enterprises and environmental service companies. If we want to promote the third-party governance model, we should firmly grasp the current policy opportunities and be based on the actual needs. At the national level, while supporting the third-party governance system of environmental pollution, we also need to actively explore the internal management methods of the system; for example, formulate project bidding and acceptance standards to promote the third-party governance system to be more mature and standardized. In addition, we should also introduce more detailed and practical legal regulations as soon as possible to facilitate the implementation of the third-party governance system.

Data Availability

The labeled data sets used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgments

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Research Article

Analysis of Chinese Painting Color Teaching Based on Intelligent Image Color Processing Technology in the Network as a Green Environment

Li Tian (iD)

Zhengzhou Normal University, Zhengzhou, Henan 450000, China

Correspondence should be addressed to Li Tian; lilytl@zznu.edu.cn

This work was conducted to study the Chinese painting color teaching analysis of intelligent image color processing technology under the network environment. First, the paper preprocesses the obtained color mural images, realizes the automatic recognition and marking of the images with different defect degrees and color fading, and uses denoising and texture background elimination to remove unnecessary background information. Then, according to the characteristic that the repair order of boundary points in the Criminisi algorithm is determined by the size of priority weight, the data items and confidence items are added. Finally, the design uses image processing technology and the loss formula to identify the connecting edge of the color area to be taught, establish the color extraction area, calculate the bit weight of the best color, find out the color extraction position, and synthesize different colors according to the original painting color superposition method. The partial differential equation is used to set the teaching code of color teaching system to realize the teaching of Chinese painting color. The experimental results show that compared with the original teaching system, the designed color teaching system has a stronger ability to recognize the edge of Chinese painting color teaching, and the quality of Chinese painting after teaching is higher. It can be seen that the color teaching system can be applied to the color teaching of Chinese painting.

1. Introduction

Digital image processing is a relatively young subject compared with the history of human fascination with visual mechanism. However, in its short history, it has been applied to almost all fields related to imaging with varying degrees of success. In recent years, the field of digital image processing has developed rapidly. Digital image has become an effective tool for scholars in psychology, physiology, computer science, and many other fields to study visual perception. The demand for image processing in military, remote sensing, meteorology, and other large-scale applications is also growing. With the development and popularization of multimedia technology, digital image processing technology and video technology have changed from professional terms to people's daily language. As a traditional painting with a long history and fine tradition, Chinese painting condenses a large amount of historical information of the Chinese nation and embodies the national wisdom of generations of people and the character of each period. At the same time, it also reflects the historical development trend, the state power reform, and other social development [1]. It can be seen that Chinese painting is not only the embodiment of China's 5000-year national spirit but also fully reflects the historical development process of the country. However, because Chinese painting appeared early and spread for a long time, it led to local fading, edge fading, and overall halo in the original colorful and bright Chinese painting. In the teaching process of Chinese painting major, color teaching is one of the compulsory courses. Quality education requires students not only to understand and master professional knowledge and skills but also to improve their comprehensive quality in the learning process and promote their all-round development. In Chinese painting color teaching, how to effectively

convey the spiritual connotation of Chinese painting color to students is very important. The study of the color connotation of Chinese painting can not only help students master painting skills but also effectively cultivate students' comprehensive quality and promote students' all-round development.

Because of the rapid development of modern computer technology and image processing technology, the color teaching of mural cultural relics has become simple and fast. Digital image processing has been widely used in the early 20th century and has gradually become a hot subject. Based on the mathematical algorithm, this technology can improve the image quality and modify the image (Figure 1) and can also extract effective information from the image to make the image effect more in line with the visual requirements of human eyes. In addition, digital image processing technology plays an important role in the virtual restoration, reproduction, and evolution simulation of traditional Chinese painting [2].

Therefore, a color teaching system of Chinese painting is designed. Through this system, the teaching area and teaching location nodes are set to teach the painting with fading problems. However, the faded edge of Chinese painting taught by this system is inconsistent with the teaching edge, resulting in an obvious edge contour color in the painting. Therefore, aiming at this problem of the original teaching system, a new Chinese painting color teaching system is designed based on image processing technology. The system focuses on the recognition ability of teaching edge to ensure that there is no color difference between the edge color and the natural color of painting [3]. The emergence of Chinese painting color teaching system has improved the teaching ability of Chinese painting color, strengthened the protection of painting, continued the Chinese painting with stories and ideas, and provided technical support for painting color teaching in other countries.

This study develops a color identification mode under the network environment, which can promote the online (rather than offline) image processing and creation and contribute to the environmental protection and energy saving by no waste of paper and painting materials.

2. Literature Review

Teixeira et al. first proposed the hierarchical transformation of digital images and finally used the hierarchical fusion mechanism to find the best teaching relationship between each layer, so that the traditional Chinese painting after teaching achieves a good visual effect [4]. Han et al. used the halftone processing mechanism of the image to obtain effective prior knowledge to restore the image, which effectively improves the teaching quality of the image [5]. Then, Liu et al. proposed a fast optimization transfer algorithm (FOTA) based on the overall variational model, which changed the univariate function into the bivariate function and improved the teaching efficiency. However, when these model algorithms are used to teach a large area of missing image information or some images with texture, the effect is

fuzzy and the image edge features are poor. Moreover, the above algorithms restore the image according to the characteristics of the known pixels in the surrounding pixels and damaged edge areas, ignoring the high-frequency components of the image [6]. In recent years, many scholars have improved image teaching algorithms to improve the image effect and quality, so as to meet the vision of human eyes. Hsing Yu et al. combined the partial differential equation with the sample and used the Euler equation of global variation combined with the original data item function to determine the order of sample block teaching, so as to teach the image [7]. Melekhin et al. took the D-S evidence theory as the confidence term and combined it with a TV model as the priority function. The algorithm effectively uses the image structure and texture information and obtains a better teaching effect [8]. Xing et al. added the image segmentation theory to the image teaching algorithm, reduced the search area to some relevant information areas, reduced the search scope while ensuring the teaching quality, and improved the teaching method. However, these algorithms need a long process in time, which is not conducive to rapid teaching [9]. Duan et al. summarized the impact of different acquisition technologies and methods on cultural relic images and digital protection. Through the analysis and summary of existing optical measurement instruments, measurement technologies, and sensors, accurate teaching data were obtained [10]. Singh et al., combining with the method of chemical analysis, proposed a method of preferentially repairing the gradient to carry out virtual teaching of ancient traditional Chinese painting, transfer the gradient of the known area of the image to the damaged area, and make the image model more optimized [11]. Liu et al. optimized the matching target criterion used in the algorithm, proposed the color gradient method for block matching, deduced the teaching method of gray image, and achieved a certain teaching effect [12].

3. Method

3.1. Digital Image Teaching Technology Based on Sample Texture. Computer graphics is a new subject that studies how to generate, process, and display graphics with digital computer. It focuses on how to turn data and geometric models into images, which corresponds to another technology: pattern recognition. Pattern recognition focuses on how to extract data and models from images, which are the opposite process. In addition, there is another discipline specialized in the geometric model and data processing, which is computing. It focuses on the computer representation and analysis and synthesis of geometric objects and studies how to establish the mathematical model of geometric objects conveniently and flexibly, how to improve the efficiency of algorithm, and how to better store and manage these model data in the computer [13]. At present, the most active research of computational geometry can be the construction and splicing of curves and surfaces, three-dimensional modeling, scattered data interpolation, computational complexity, and so on. The relationship of all related technologies is shown in Figure 2.
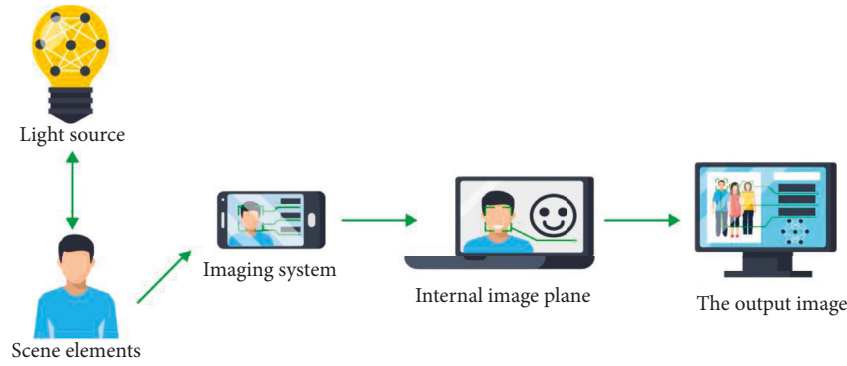
FIGURE 1: Image color processing technology.
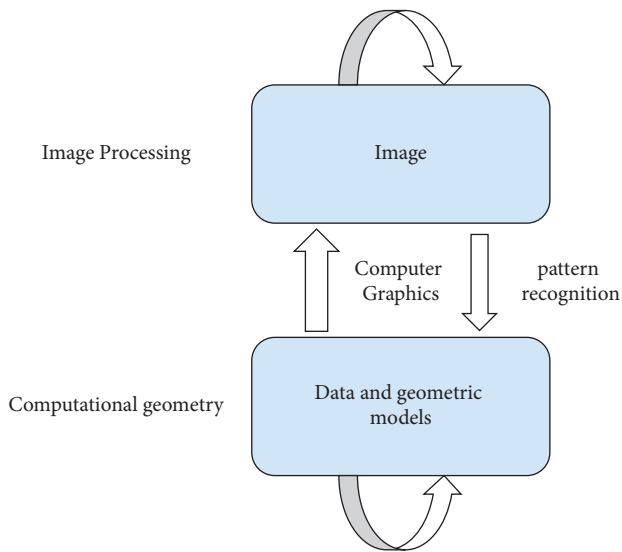
FIGURE 2: Relationship between computer graphics and related disciplines.

FIGURE 3: Basic model of image processing.

The purpose of digital image teaching is to fill the defect information in the image through a system, restore the original appearance of the image, and meet the aesthetic requirements of human vision, so that the observer will not notice that the image has been damaged or taught before. The general image processing model is represented as the input-output system shown in Figure 3.

In the basic model of image processing, U1 is an image or a series of images, the image processing system is a linear or nonlinear processing algorithm, such as denoising, restoration, coding, and compression, and U2 is the output characteristic image.

Image teaching needs to emphasize the coherence and structural integrity of the texture in the defect area. Therefore, when using the sample-based texture synthesis technology in image teaching, it is necessary to adopt a strategy different from the previous texture synthesis.

First, texture synthesis technology generally adopts the scanning sequence from top to bottom to left and right or spiral to synthesize regular new textures [14]. The teaching area of the image is often very irregular, so it should be processed layer-by-layer from the periphery to the interior of the teaching area, and it is not suitable to adopt a fixed processing order for

texture synthesis. Second, in the process of teaching the specific damaged natural image, according to the direction of the structural line around the area to be taught, extend the structural line and connect it to the inside of the area to be taught, while taking into account the continuity of the structural line along the edge of the damaged area and the maintenance of the texture detail content, search the matching block along the structural line direction of the known area, and copy the found matching texture detail module to the damaged area. Suppose the digital model of simplified image teaching is as shown in Figure 4: let I represent the damaged image to be taught and Φ is the information defect part in image I. The whole process of image teaching is to judge and guess according to the effective information in the known area Φ under the condition of meeting the requirements of human vision, fill in the information of the area to be taught Φ, and finally teach as a complete image.

The specific steps of the sample-based image teaching algorithm are as follows: first, calculate the priority value of each point of the filling boundary of the damaged area by using the following equation:

$$P(p) = C(p)D(p), \tag{1}$$

where

$$C(p) = \frac{\sum C(q)}{|\psi_p|}, \tag{2}$$

$$D(p) = \frac{|\nabla I_p \cdot n_p|}{\alpha}. \tag{3}$$

Among them, $C(p)$ is called the confidence term of the block to be taught and expressed as the proportion of effective pixels in the block to be taught, and it represents the amount of effective information around a pixel p. $D(p)$ is the data item of the block to be taught, n_p is the unit normal vector of the contour at point p, Δ_p^I is the isoilluminance perpendicular to the gradient of point p, and the initialization of $C(p)$ is
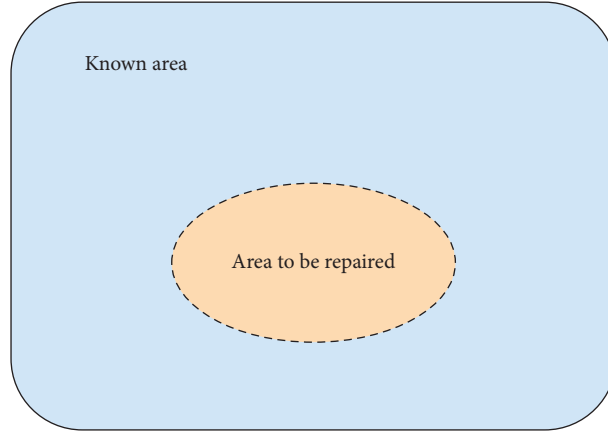
FIGURE 4: The mathematical model of image teaching problem.

$$C(p) = \left\{ \begin{array}{c} 0, p \in D \\ 1, p \in (\Omega/D) \end{array} \right\}. \tag{4}$$

The Criminisi algorithm takes the repair order of boundary points as the center, first finds the optimal value, and then finds the best sample block. Matching according to the similarity between the area to be repaired and the optimal sample block makes the ductility of image structure and texture look more natural after teaching. However, when searching by pixel, if the edge information of the image is ignored, the method of calculating priority weight only includes the boundary features around the repaired area [15], error accumulation and fuzziness will occur. After each priority calculation, when updating the priority of all sample blocks on the leading edge of image filling, the confidence of damaged pixels in the image to be taught should be updated to equation (5) to reduce the change trend of gradual reduction of partial confidence.

$$C'(p) = \frac{\sum C(p)}{|\psi_p|}. \tag{5}$$

Error accumulation will occur when the Criminisi algorithm directly updates the confidence. Figure 5(a) is the original image, Figure 5(b) is the target area mark, and Figure 5(c) is the teaching effect diagram of optimizing the processing of strong edge information areas. It can be seen from the renderings in Figures 5(a) and 5(c) that the effect of continuous optimization of strong edges is not very good. This is mainly because in this algorithm, the priority is calculated by $P(p) = C(p)D(p)$. If the confidence term $C(p)$ is equal, the greater the $D(p)$, the higher the priority, and the priority of the block where the strong edge is located will be higher than that of other data blocks. However, there will be bad effects in the process of processing. Here, curvature can be added to the priority to change the priority size, avoid the error of filling order, and alleviate the error accumulation.

In practical application, the effect of this algorithm is not so ideal. It only performs matching search in the specified effective area. The disadvantage of using the global search mode to search the matching sample block is low efficiency, and the size of the template will have a great impact on the search and filling. In addition, finding the matching block takes a long time, high cost, and low efficiency. In the process of filling the image with the sample texture algorithm [16], with the increase of the number of iterations, the confidence item will quickly drop to zero. Even if the data item is large, the priority function will gradually become zero, resulting in inaccurate teaching sequence and image teaching distortion and affecting the teaching effect. Therefore, the priority function is changed to

$$P(p) = (1 - \lambda)e^{C(p)} + \lambda D(p), (0 < \lambda < 1), \tag{6}$$

where λ is the weight coefficient, and in the original priority mathematical model, the confidence item and the data item are replaced by the additive form. The weights of $C(p)$ and $D(p)$ are changed by adjusting the value of the brother, that is to say, the weights of the structural information and texture information in the priority calculation process are adjusted in the process of digital mural image restoration. Through the comparison of experiments and relevant literature, it is found that when the value of brother is up and down in the range of 0.38, the processed image signal-to-noise ratio is better and the time optimization is better.

3.2. Color Region Extraction Technology of Color Table Clustering. In the image database, the image objects distributed in the image have different positions, sizes, and orientations, and the starting points of these shape boundaries are also different in the process of extracting shape boundaries. Therefore, these situations need to be standardized to make the shape description in a unified coordinate position, unified size, unified orientation, and unified starting point, so as to ensure that the shape description is independent of the spatial orientation of the shape. We use the regional features of shapes to normalize them. The specific process is shown in Figure 6.

At first, we get the center of gravity (x_c, y_c) of the image object and then translate the center of gravity of the image object to the coordinate origin, so as to ensure that all shapes

(a)   (b)   (c)
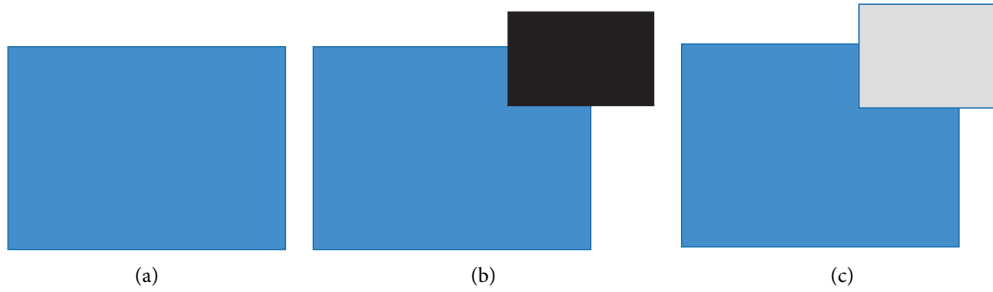
FIGURE 5: Problems in continuous priority treatment of strong edges. The original image (a), mark the patched area (b), and the result image (c).

are independent of their specific positions in the image. Generally speaking, for a shape, its principal axis is unique (except for shapes such as polygons and circles), so the direction of its principal axis can be used to represent the direction of the whole object. Because different objects have different directions, the principal axis of each object can be rotated to coincide with the x-axis or y-axis, so as to ensure that different image objects have a unified orientation. For different images, the size of the object is different. We define the radius of the shape as the maximum distance from all boundary points of the shape to its center of gravity. It can be seen that for a specific shape [17], its radius is certain. We can uniformly shrink the whole shape with the center of gravity as the scaling center, so that these shapes can be compared in a unified size. Then, the object is transformed symmetrically along the x-axis or y-axis. This process is called the normalization of shape objects.

3.2.1. Color Image Adaptive Threshold Processing. The purpose of threshold processing is to segment the image, remove the multicolor background from the object, and fill it with white, so that the background of the image is relatively single, which is conducive to the subsequent color histogram analysis, as shown in Figure 7.

3.2.2. Histogram Analysis of Color Frequency

(1) The color frequency histogram of the image after the threshold is calculated.

(2) According to the Euclidean distance of space of two colors, the similarity clustering of color frequency histogram is carried out: the nearest neighbor principle is adopted to merge the close color classes in the color table.

(3) The color frequency histogram is sorted according to the frequency, and the direction is from large to small.

(4) According to the color table and color frequency histogram, the average value of the colors contained in the color class is obtained, and this average value is taken as the typical color of this class. The white background has the largest value in frequency, which is helpful to distinguish the background from the target color class.

3.2.3. Color Clustering. If a color is closest to the color in the cluster, it will be clustered into that category. The clustering results show the hierarchical results in the form of multiple windows. The key algorithms are as follows:

(1) The algorithm for determining the color separation number: when the user gives the merging color difference, the computer merges the colors. When merging is impossible, the remaining color number is the color separation number.

(2) The spot color separation color selection algorithm: transform many colors into several colors and make the changed image have the minimum color difference.

(3) The image color separation processing algorithm (no jitter and jitter).

(4) The color points of color separation are omitted.

3.3. Knowledge Expression of Mural Images. We call semantic features such as image content and background and experts' empirical knowledge and experimental statistical knowledge as knowledge. The knowledge referred to here is actually a kind of domain knowledge [18]. In the field of traditional Chinese painting, the knowledge mainly includes the following:

(1) The experience and knowledge accumulated by artists for a long time: this kind of knowledge is usually summarized on the basis of referring to historical documents and relevant pictures and researching the clothing system, bun decoration, and customs, which has universal guiding significance.

(2) Traditional Chinese painting protects the knowledge of scientists: this kind of knowledge is the discoloration mechanism of pigments obtained through the analysis of pigment chemical experiments. This kind of knowledge accurately reflects the discoloration law of lead containing pigments. For example, lead (pb304) changes from orange red to brown red and finally black red under the sun.

(3) From the mural's own knowledge: because of the long history, the change of environmental conditions, and other objective reasons, it is impossible to comprehensively and accurately grasp the chemical change law of the pigments of different components
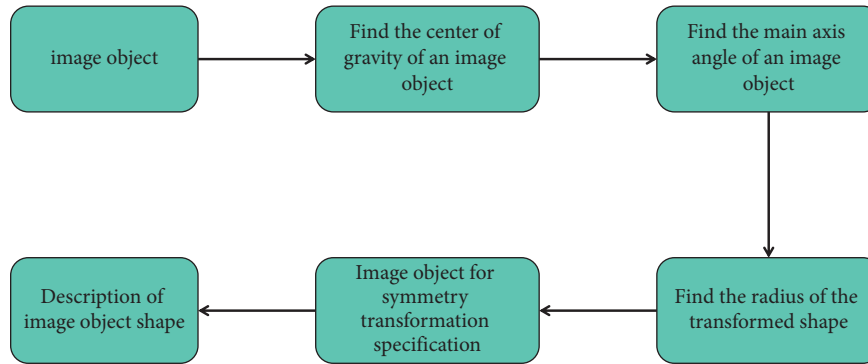
FIGURE 6: Normalization process of the image object.
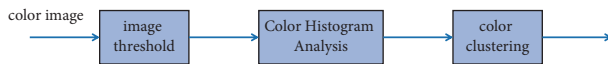
FIGURE 7: Flowchart of color processing.

of traditional Chinese painting and the color assignment method of traditional Chinese painting. Therefore, the mural itself plays a particularly prominent role as a source of knowledge. Here, it refers to works that do not change color or do not change color seriously.

(4) Experimental knowledge obtained from the computer simulation test: because there are some special cases, there is no ready-made above two kinds of knowledge as a reference. At this time, we use the characteristics of computer easy test to test a variety of restoration functions and select the restoration function that is most likely to meet the actual situation as a special empirical knowledge according to its effect.

Traditional Chinese painting is the same to the above painting styles, and each mural was painted in a specific dynasty and a specific cave at that time. Therefore, we believe that the investigation of traditional Chinese painting can be carried out from the three dimensions of time, space, and style, as shown in Figure 8, which provides a basis for the design of mural library. At present, the investigation of traditional Chinese painting mainly studies the development and evolution process of mural style from the time dimension, while the space dimension mainly represents the specific location of the hole window wall of a mural, which is not the key of the research [19].

The evolution process of discoloration and fading is a color transition process. Color transition refers to finding a transition curve in the color space to slowly change from one color to another [20]. Considering that the discoloration or the fading process usually starts relatively fast and then slows down slowly, it is not appropriate to adopt linear transition. There are two ways to achieve this effect: one is to insert intermediate color transition values and use these transition values to control the evolution speed, and from these transition values, a Bessel curve can be obtained as the transition curve of color transition; the second method is to use some nonlinear functions. At first, the slope is relatively large and then gradually slows down.

In fact, the intermediate process of transferring from one color to another with constraints is in line with the color transition. We can get several typical intermediate colors by setting the specific values of transparency and white matter ratio at typical times and using the computer color mixing model. However, the discoloration and fading of pigment is a relatively continuous track, which requires us to use the typical intermediate color simulation to generate the simulation track of color transition [21]. Color transition is different from ordinary morphing. It is constrained. What we use to demonstrate is traditional Chinese painting, which implies that all colors on the color transition track should be colors (as shown in Figure 9).

4. Experimental Analysis

In order to test the feasibility of the designed teaching system, simulate a Chinese painting with fading and halo as the experimental object, use the designed system and the original teaching system to teach the color of the Chinese painting, respectively, analyze the two groups of experimental data, and draw the experimental test conclusion [22].

We build the simulation experiment platform and set the experimental environment parameters. In order to ensure the accuracy of the two groups of experimental test results, simulate a color space, take the above color space as the color reference data to test the teaching effect, and use the two teaching systems to teach the color of Chinese painting. In this experiment, through the obtained painting scanning results, the recognition ability of the two teaching systems to the color halo or faded edge is analyzed.

4.1. Result Analysis. The experimental test results of the designed system are included in the experimental group. The test results of the original system are included in the reference group, the differences between the two groups are compared, the recognition ability of the teaching system is analyzed, and the experimental conclusion is drawn. According to the test results, the designed teaching system recognizes all the edges of the experimental object to form a closed edge curve. The system realizes the color teaching
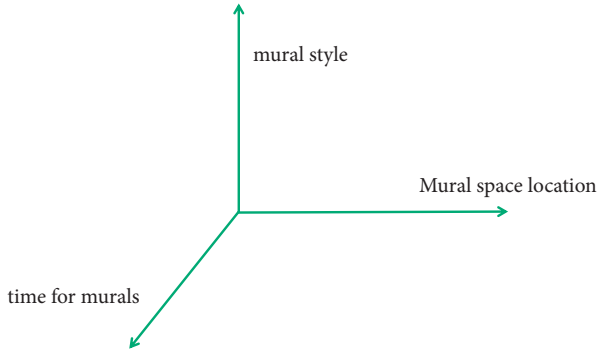
FIGURE 8: Three-dimensional analysis of traditional Chinese painting.
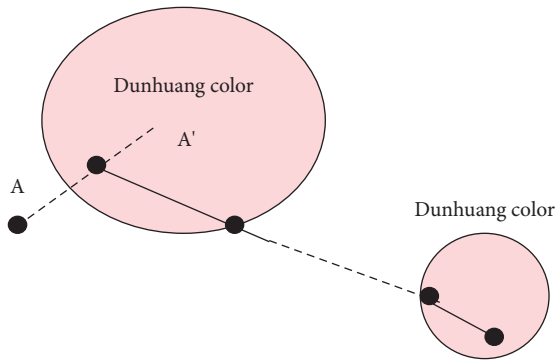
FIGURE 9: Color transition trajectory.

according to the closed edge to ensure that the color halo will not appear in the area after teaching. The original teaching system has a weak ability to identify the transition edge of painting color, resulting in the loss and jitter of the identified edge. At the same time, the edge line also has breakpoints, including some false edges, resulting in a large area of halo in the area taught according to the edge line, which is very different from the original color [23]. In order to further verify the teaching effect of Chinese painting color of the designed system, the intelligibility and fidelity of Chinese painting color are used as the effective measurement index of the teaching effect of the system. Through the color error analysis between the Chinese painting after teaching and the original image, the image quality is quantitatively evaluated. The Chinese painting with good quality has less error, higher understanding and fidelity, and higher similarity with the original image.

The deviation error between the traditional Chinese painting image after systematic teaching and the original image is used to objectively evaluate the quality of traditional Chinese painting after color teaching. The quality of traditional Chinese painting image is usually evaluated by time, mean square error, peak signal-to-noise ratio, or structural similarity.

Let the image size be $M \times N$, the original image is represented by $I_0(i, j)$, and the image after teaching is represented by $I_1(i, j)$. The mean square error (MSE) of image quality evaluation after system teaching is as follows:

TABLE 1: Evaluation results of Chinese painting image quality after two kinds of system teaching.

Quality evaluation index		Experience group	Test group
Execution time	Color halo teaching	16.38	26.35
	Fading edge teaching	16.35	29.36
MSE	Color halo teaching	2.39	6.58
	Fading edge teaching	3.68	6.35
PSNR	Color halo teaching	31.39	29.38
	Fading edge teaching	26.38	29.58
SSIM	Color halo teaching	0.8963	0.9687
	Fading edge teaching	0.9632	0.9541

$$\text{MSE} = \frac{\sum_{i=1}^{M} \sum_{j=1}^{N} \left[I_0(i, j) - I_1(i, j) \right]^2}{M \times N}. \tag{7}$$

In the formula, the smaller the value of MSE, the higher the quality of image teaching. The peak signal-to-noise ratio (PSNR) is as follows:

$$\text{PSNR} = 10 \times \lg\left(\frac{R^2}{MSE}\right). \tag{8}$$

The higher the PSNR value, the better the image quality after teaching.

Combined with the similarity measurement results of all colors of Chinese painting, the final SSIM value of Chinese painting image is obtained. The larger the SSIM value, the better the image quality after teaching. We compare the execution time, mean square error, peak signal-to-noise ratio, and structural similarity of the two systems for color halo teaching and fading edge teaching in Chinese painting color teaching [24], and we evaluate the image quality of Chinese painting after the teaching of the two systems. The results are shown in Tables 1–5.

The comparison of the above experimental execution time and effect parameters is shown in Table 2.

By analyzing the data in Tables 1–5, it can be seen that the execution time of Chinese painting color teaching of the designed teaching system is far less than that of the original system. Among them, the execution time of image fading edge teaching is saved, which is 16.09 s shorter than that of the original system, which greatly improves the operation efficiency of the system. The mean square error of the designed teaching system is only about 50% of the original system, which greatly improves the sensory effect after image teaching, and the PSNR and SSIM of the designed teaching system are greater than the original system [25].

Figure 10 results show that the image quality of Chinese painting after the teaching of the designed system is higher and it is easier to achieve people's visual and ideal psychological recognition. From the above experimental results, compared with the Criminisi algorithm and the literature algorithm, the improved Criminisi algorithm proposed in this topic consumes relatively less time. The visual effect of teaching also meets the evaluation requirements, which verifies that the performance of the improved algorithm of this subject has been greatly improved and the teaching effect has been greatly improved when compared with other algorithms.

TABLE 2: Comparison of execution time of two algorithms.

Mural image to be taught	Time taken by Criminisi algorithm (seconds)	The time taken by the algorithm of this subject (seconds)
Experimental mural I	26.35	16.38
Experimental mural 2	24.39	18.36
Experimental mural 3	29.36	25.36

TABLE 3: Comparison of PSNR effects of three teaching algorithms.

	PSNR (dB)		
	Experimental mural 1	Experimental mural 2	Experimental mural 3
Criminisi algorithm	25.39	26.38	29.54
Literature algorithm	24.36	27.12	31.68
Algorithm of this subject	29.58	27.58	32.68

TABLE 4: Comparison of SSIM effects of three teaching algorithms.

	SSIM		
	Experimental mural 1	Experimental mural 2	Experimental mural 3
Criminisi algorithm	0.9563	0.9423	0.9521
Literature algorithm	0.9452	0.9432	0.9534
Algorithm of this subject	0.9231	0.9874	0.9581

TABLE 5: Comparison of the monitoring error results of the three teaching algorithms.

	Monitoring error results	
	The first group of experiments	The second group of experiments
Criminisi algorithm	20.3%	38.3%
Literature algorithm	17.3%	26.4%
Algorithm of this subject	8.6%	16.5%
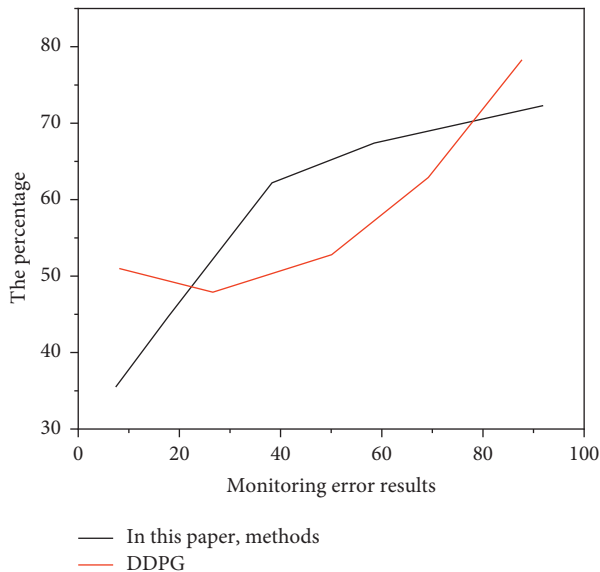
FIGURE 10: Monitoring error results.

5. Conclusion

This paper presents an image reconstruction method based on 3D virtual reality technology. The experimental results show that the image reconstruction method based on 3D virtual reality technology has effectively improved the quality of the reconstructed image compared with the traditional image reconstruction method. In the environment based on differential sensitivity, the recall and precision of image pixel features are as high as 0.99. When reconstructing the noisy image, the peak signal-to-noise ratio and the standard signal-to-noise ratio of the reconstructed image by this method are higher than those based on very sparse random projection and sub-Gaussian random projection, which verifies the application value of this method. The systematic emphasis on splitting the concept of teaching object is based on the consideration of teaching feasibility, which is not completely consistent with the actual painting process. Moreover, because of the difficulty of extracting and describing teaching knowledge and the complexity of mural image content, it will take a long time to develop some image processing algorithms of all white movement. Not all the results produced by the system are satisfactory, and there are many human-computer interactions. This needs to continue to improve the whiteness and accuracy of a series of algorithms, such as automatic layering and region extraction, so as to facilitate and save the time of teaching a mural. Because of the difficulty of extracting and describing teaching knowledge and the complexity of mural image content, future research will focus on improving the automation and accuracy of image processing methods and minimizing human-computer interaction. This needs to continue to tap the deep knowledge of the field, continuously accumulate the chemical knowledge, empirical knowledge, and class library materials referred to in teaching, deeply study various color spaces, and improve a series of algorithms, such as automatic layering and region extraction.

Color teaching is an important part of Chinese painting teaching. In order to ensure that students learn color knowledge well, we need to let students master the spiritual connotation of color and fully apply it to color painting.

Therefore, teachers need to pay attention to the transmission of spiritual connotation in color teaching and let students pay attention to and master its spiritual connotation through various effective ways, so as to improve students' ability to understand the color of Chinese painting and improve learning efficiency.

Data Availability

The labeled dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Retraction

Retracted: Government Environmental Governance and Enterprise Coordinated Green Development under the Goal of "Double Carbon"

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] F. Liu, J. Jiang, and S. Zhang, "Government Environmental Governance and Enterprise Coordinated Green Development under the Goal of "Double Carbon"," *Journal of Environmental and Public Health*, vol. 2022, Article ID 6605935, 10 pages, 2022.

Research Article

Government Environmental Governance and Enterprise Coordinated Green Development under the Goal of "Double Carbon"

Fang Liu (iD),[1] **Jingjun Jiang** (iD),[2] **and Shuwen Zhang** (iD)[3]

[1]*School of Economics, Zhongnan University of Economics and Law, Wuhan, Hubei 430000, China*
[2]*Business School, Henan Normal University, Xinxiang 453000, China*
[3]*Law School & Intellectual Property School, Jinan University, Guangzhou 510632, China*

Correspondence should be addressed to Shuwen Zhang; zhangshuwen@jnu.edu.cn

China's 13th five-year plan puts forward the development concept of "green development" and takes the construction of green financial system as the development strategy, which shows that the concept of environmental governance and green development is becoming more and more important for national economic development. It is a major strategic task for China to build an environmental governance system dominated by the government and dominated by enterprises and implement the main responsibility of enterprise environmental governance. At present, the environmental supervision of local governments needs to be improved urgently. It is necessary to strengthen the production regulation of enterprises and promote the emission of "three wastes" up to the standard based on the principle of "polluter pays." The green development of enterprises is not only conducive to the improvement of their own "three effects" and corporate image but also has the external spillover effect of giants and is conducive to the construction of ecological civilization. Therefore, this study will focus on the collaborative governance in the field of environment, explore the ideal collaborative governance framework in the process of environmental collaborative governance, as well as the difficulties and optimization paths of collaboration, and put forward corresponding suggestions for the current environmental governance.

1. Introduction

The report of the 19th National Congress of the Communist Party of China regards pollution prevention and control as one of the three key battles to win the decisive victory in building a well-off society in an all-round way and puts forward the construction of an environmental governance system dominated by the government and dominated by enterprises, to implement the major strategic task of the main responsibility of enterprise environmental governance [1]. Polluters are the main body responsible for pollution control. Strengthening their environmental protection responsibility will help to improve environmental quality and promote the formation of a standardized and fair market competition environment. The transition of China's

economy from high-speed growth to high-quality growth is not only due to the transformation of demand by the dynamic mechanism of economic growth but also forced by the actual situation of bearing pressure on China's resources and environment. In the past high-speed economic growth stage, it was mainly based on the development of heavy industry economy, which inevitably caused serious pollution problems. This shows that the source of environmental pollution is industrial enterprises, especially those in heavy pollution industries. Therefore, if we can effectively control the pollution emission of heavy polluting enterprises, it will certainly bring China's environmental governance to a higher level [2].

Based on the urgent need to improve China's ecological environment, the growing desire of the people to "look

forward to environmental protection" and "seek ecology," the increasing pressure of enterprise transformation and upgrading, and the urgent need for correct guidance of the development concept and performance view of some local leading cadres, how to test the effectiveness of local environmental governance construction and development and optimize the coordination path according to the problems, shortcomings, and difficulties in the current local governance practice improving the governance system is in line with the practical needs of China's adherence to the green development strategy and will play a key role in China's practice of the concept of green development [3].

2. Concept Definition and Theoretical Basis

2.1. Concept Definition

2.1.1. Enterprise Green Development Model. As a profit-making organization, enterprises naturally have the pursuit of profits. The rapid development of enterprises has created conditions for the pursuit of profits. Compared with the traditional development model, the green development of enterprises is a development model different from the previous development model with green as the core, which is a sustainable enterprise development model. Green development of enterprises is a new green-oriented development model. This development model meets the standards of resource conservation and ecological civilization and belongs to an important part of the construction of ecological civilization. Under the background of vigorously promoting the construction of ecological civilization, the green development of enterprises is facing unprecedented opportunities and challenges. The green development of enterprises belongs to the category of green development, but the main body is enterprises. Therefore, it has the general characteristics of green development and has the characteristics of maintaining the unique green development of enterprises [4].

(1) Strategic and Long Term. Enterprise green development belongs to a new enterprise development model, which is different from the traditional non-green development model. This development model pursues the overall strategic green development of the enterprise. Enterprise green development is not only the need of a certain department or stage of the enterprise but also the development model of the enterprise as a whole involving all departments of the enterprise and includes the development model of each stage of enterprise development. Therefore, it has strong integrity and strategy. At the same time, we should make strategic arrangements and realize the needs of green development. At the same time, the green development strategy of enterprises is not the development needed for a while, but the development model that needs to be adhered to for a long time. Enterprise green development belongs to a development model that can bring long-term benefits, and this benefit can only be obtained in the process of long-term persistence. Therefore, whether considering the current interests or long-term strategic thinking, enterprises need to adhere to the development model of green development for a long time [5].

(2) Comprehensive and Phased. In addition to long-term planning, the green development of enterprises also needs richer connotation and comprehensive consideration and thinking. The green development of enterprises needs comprehensive design and planning, and the green development strategy and planning of enterprises must be well designed. Enterprise green development also needs to re-design the system and mechanism design of enterprise green development [6]. The system suitable for green development is to arrange the organization and distribution of rights and responsibilities of enterprise green development; the mechanism suitable for enterprise green development is to consider the institutional method of enterprise green development [7]. Enterprise green development also needs to pay attention to the establishment of enterprise green development consciousness, to create a good enterprise green development culture [8]. Therefore, the green development of enterprises needs comprehensive consideration and planning. At the same time, the green development of enterprises has a long-term development stage. Different enterprises are in different green development environments at different development stages and have different needs for green development. Moreover, the same enterprise has different needs at different stages of development [9]. Therefore, the green development of different enterprises and different development stages has different development modes, and the green development of enterprises has the characteristics of stages [10].

(3) Innovation and Difference. Enterprise green development is a concept with rich connotation, and it is a concept of continuous innovation. The green development of enterprises is put forward on the basis of the deterioration of resource problems and environmental problems [11]. The main purpose is to promote the green development of the whole society through the green development of enterprises. The initial green development of enterprises is more from the perspective of development consciousness and development concept [12]. The real green practice is still limited, mainly to deal with the internal sustainable development and efficiency of enterprises. Later, with the gradual deepening of the concept of green development, the connotation of enterprise green development gradually expanded [13]. In addition to meeting the needs of the enterprise itself, it also needs to further meet the needs of the enterprise's external environment and produce positive external effects. Therefore, the connotation and extension of enterprise green development are expanding and innovating. As environmental protection has become a global issue, different countries and regions are bound to encounter this problem, which will put forward more or less requirements for the green development of enterprises. However, due to the different national conditions and practical needs, the green development strategies of different countries and regions are very different [14].

2.1.2. Multicenter Collaborative Governance. Both "collaborative governance" and "polycentric governance" are facing the realistic changes that social governance urgently needs the wider participation of public or private stakeholders and form a multilateral decision-making process aimed at directly formulating or implementing governance policies and management plans. To form such a consensus and efficient governance system, whether it is "collaborative governance" or "multicenter governance," we should make an effective balance between risks and benefits, ensure positive interdependence among stakeholders, and make the cooperation process fair, inclusive, and complementary.

However, it is obvious that the simple and blind pursuit of "multicenter" will undoubtedly lead to the defects of coordination and complementarity in the process of cooperation and make governance become the surface form of "metaphysics," which can not go deep into the root causes to solve the problems of social governance. Similarly, relying solely on "synergy" to solve governance problems will also lead to the compromise of all actors in order to achieve a unified goal, and the interests of all parties cannot be guaranteed; in particular, the needs of vulnerable subjects will be excessively ignored. To make multicenters play an effective role in the collaborative process, we should not only avoid the split of all parties but also avoid compromise. Therefore, we integrate the multicenter theory and synergetics into the field of governance and establish a collaborative governance model with the participation of multiple subjects, so that multiple centers can effectively perform their respective duties, cooperate with each other, and give greater play to the collaborative effect.

2.2. Theoretical Basis

2.2.1. Collaborative Governance Theory. Collaborative governance means that under the open framework composed of various power subjects in social public life, through administrative, legal, technical, public opinion, and other means, the originally chaotic elements coordinate and interact with each other to form an orderly collaborative system, so as to effectively manage public affairs and finally achieve the purpose of safeguarding public interests. According to the theory of collaborative governance, the government, enterprises, and people can all be participants in public affairs, and the common interest has become the key point affecting the decision-making behavior of different participants. Whether the participants can intervene and express depends on their "ability to raise and solve problems" [15].

First is the overall goal of overall coordination. It can not only meet the requirements of multi interests but also mobilize the enthusiasm of multi-governance subjects to participate in governance. Second, the collaborative governance system is an open system [16]. In this system, the subjects participating in governance have the characteristics of diversity, and the diversity of participants also requires the openness of the governance system [17]. Only in an open environment can all market players, nongovernmental organizations, and the public except the government have the opportunity to participate in governance. Subjects can achieve governance objectives through equal consultation, negotiation, and cooperative action and finally maximize local and overall interests. Third, the process of collaborative governance is a dynamic process [18]. Due to the uncertainty of the environment, the relationship between local environmental cooperation and governance subjects, the objectives of different stages, governance objects, and the organizational framework, cooperation rules, and resource exchange in the governance process are dynamic. Fourth, the boundary of collaborative governance is relatively vague. In the process of collaborative governance, under the action of synergy, the boundary of the original subsystem becomes more blurred due to the close relationship between subsystems. It is mainly reflected in the fuzzy boundary of the governance scope of public affairs and the fuzzy boundary between the governance subjects [19]. The fuzzy boundary is conducive to the better governance effect of collaborative governance. In addition, the biggest feature of collaborative governance is the diversification of its governance subjects as shown in Figure 1. Under collaborative governance, the leading role of the government and the participation of multiple governance subjects in various social departments are the manifestations of the participation of multiple governance subjects as shown in Figure 2 [20].

2.2.2. Stakeholder Theory. Potential conflicts of interest between managers and stakeholders or between stakeholders also blur their definitions and roles. Based on the characteristics of different attributes, stakeholders can be divided into deterministic stakeholders, expected stakeholders, and potential stakeholders. The priority of deterministic stakeholders to the three key attributes is power, legitimacy, and urgency. It is proposed that more consideration needs to be given to primary and secondary stakeholders in order to effectively allocate and manage scarce resources. However, key stakeholders are more important to the survival and well-being of enterprises. Therefore, some scholars emphasize that there is a considerable gap between the interests of stakeholders understood by a key organization and the interests perceived by stakeholders themselves. Some scholars believe that this dichotomy may lead to unexpected resistance among stakeholders in the process of implementing management decisions. Therefore, the concept of "stakeholder diversity" is proposed, emphasizing that management must recognize that stakeholders are part of the network rather than a "binary image."

Stakeholder theory was initially applied in the field of economic management. With the development of relevant research, this theory has gradually developed in the field of public management and has been widely used in the research of government, citizens, and nonprofit organizations in the third sector. In the field of environment, all citizens live in it. As the direct bearers of ecological change, they have the most say in ecological governance in the face of the infringement brought by ecological damage. Therefore, stakeholder theory is an important theoretical basis for citizens to participate in
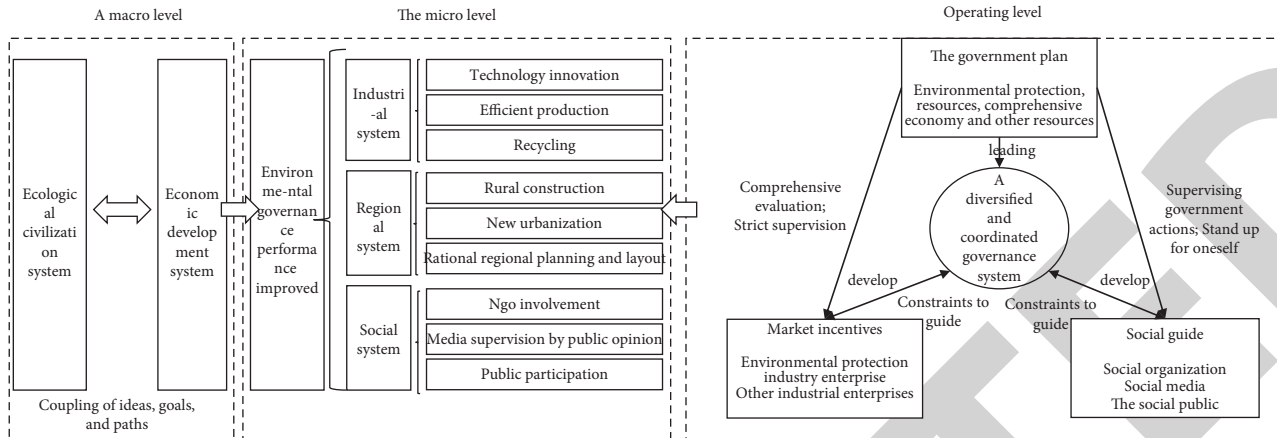
FIGURE 1: System framework of China's environmental collaborative governance.
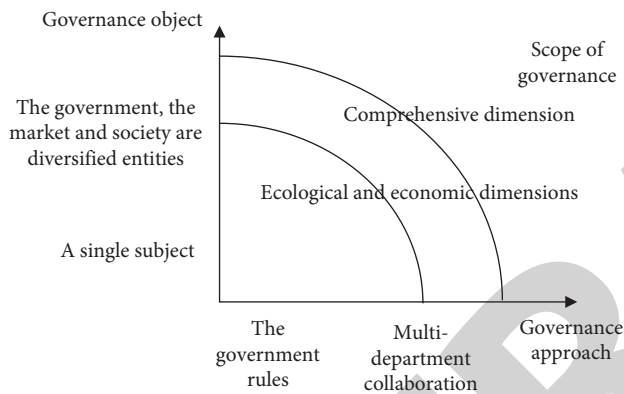
FIGURE 2: Logic of environmental governance in China.

ecological governance. To realize the long-term development of the country, the government's ecological governance must include multiple stakeholders in the ecological governance, achieve the consistency of governance objectives through consultation and cooperation, and finally achieve governance results.

2.2.3. Environmental Kuznets Curve Theory. The environmental Kuznets curve shows the impact of economic development on the degree of environmental pollution through the evolution simulation between per capita income and environmental pollution indicators; that is, in the process of economic development, the environmental situation deteriorates first and then improves gradually. The theoretical explanation of this relationship mainly focuses on three aspects: economic scale effect and structure effect, the relationship between the demand for environmental services and income, and the government's policies and regulations on environmental pollution.

After the environmental Kuznets curve hypothesis was obtained, many experts made research using the pollution data in different regions and found that the curve hypothesis was valid in most cases. In the initial stage of economic development, the per capita income is low, mainly due to the negative effects of social scale expansion and social structure

changes. With the increase in per capita income, environmental pollution will inevitably fall into an irreversible situation. However, when the per capita income reaches a high level, technological change and social structure change will have a positive effect on the environment. The per capita income will increase, but the environment will not deteriorate and tend to improve. In addition, in the actual process, because the degree of environmental regulation is not necessarily "inverted U," there are three other similar curves. After the environmental Kuznets curve was proposed, a large number of scholars calculated the specific value of the inflection point of the environmental Kuznets curve through the analysis of the data database of each region and country, which can be obtained through verification. They believe that this is the inevitable result of environmental pollution and social development. If a government is laissez faire to the environment, those countries that have gone through the development model of pollution before treatment are the lessons of developing countries as shown in Figure 3.

3. Current Situation of Environmental Collaborative Governance in China

3.1. The Differences in the Forms of Environmental Regulation Lead to the Heterogeneity of Green Development of Enterprises. Enterprise green innovation can include green management innovation, green process innovation, green product innovation, and green technology innovation. However, due to the consideration of quantifiable form and the impact on the effect of environmental pollution control, this study only selects the green technology innovation of listed companies in heavy pollution industry as the research object. The final empirical results show that both command-based and market-based environmental regulations have a significant role in promoting enterprise green innovation. Among them, market-based environmental regulation is selective in a more flexible way, and its role in enterprise green innovation is stronger than command-based regulation, while public participation in environmental regulation has no significant role in green innovation due to less administrative binding force and imperfect system construction. In
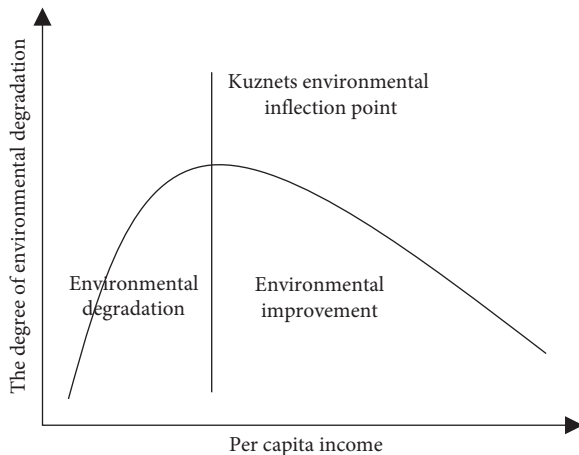
Figure 3: Environmental Kuznets curve.

addition, the moderation of environmental regulation intensity has a threshold effect on green innovation, but it only exists under the means of imperative environmental regulation. There is an inverted "U" structural relationship between them. Moderate imperative regulation can promote the green innovation of enterprises to reach the optimal value; there is only one-way linear relationship between market-oriented and public participation environment. In addition, giving executives different compensation and equity incentives plays a significant positive role in promoting the output of green innovation under the role of regulation, but relatively low equity incentives and higher salary incentives are more conducive to the green innovation of enterprises. The above results show that environmental regulation is an important means to promote the output of green innovation of enterprises, especially the market-based regulation means. To solve the environmental pollution from the root, we should take the market-based regulation means as the leading, supplemented by the command-based regulation means with appropriate intensity, and gradually improve the construction of public participation regulation tools. In addition, when strengthening the output of green innovation within enterprises, we can consider supplementing the lack of external regulation through the management incentive system of low equity and high salary.

3.2. Under Environmental Regulation, Enterprises Should Pay Attention to the Change in Concept, from Passive Emission Reduction to Active Green Innovation. Since the 1990s, a "green revolution" has sprung up all over the world. The issue of environment and development has become the center of a new round of multilateral trade negotiations, namely the "green round." As the WTO allows member states to take corresponding measures to strengthen environmental protection, green barriers will inevitably exist and become the most important "disguised trade barriers." To follow these green trade rules, break through green barriers, and avoid trade sanctions, enterprises must implement green brand strategy to achieve rapid and healthy development.

The construction of ecological civilization has penetrated into people's daily life. It can be verified from the pilot of waste classification in Shanghai. On the one hand, it shows that the government has strengthened the governance of ecological environment; on the other hand, it shows that the concept of environmental protection has been rooted in every public heart. The enhancement of public awareness of environmental protection will certainly guide the upgrading of consumers' consumption ideas, and green environmental protection and clean energy products will be highly respected. If enterprises can convey the concept of proactive environmental governance to the outside world, they will be recognized by more consumers and investors and increase the competitiveness and economic value of enterprises.

3.3. Preliminary Practice of Enterprise Green Strategy. When seeking development, enterprises should adhere to the requirements of sustainable development and organically combine the concept of green environmental protection with production activities, so that their own interests and the cause of green environmental protection can be win-win, and economic development and ecological development can be coordinated, to finally achieve the perfect consistency of social interests, collective interests, enterprise interests, and ecological interests and realize real sustainable development. To achieve consistency, our enterprises are required to realize their own interests while taking the protection of the ecological environment as the basis and always bear in mind that social interests, collective interests, and ecological interests are above everything. It is the premise for enterprises to realize their own interests and develop. Enterprises can carry out normal production and life activities only on the premise of not violating social interests, collective interests, and ecological interests to truly realize the long-term development of the enterprise itself. Enterprise green culture management requires enterprises to consider the importance of natural resources in the process of production and sales. We must stop the production activities at the cost of polluting the environment. Our entrepreneurs are required to have the awareness of green environmental protection and really care about the long-term development of the enterprise, not just the short-term development. When managing, our entrepreneurs should really achieve the management decision of sustainable development, the management awareness of green culture of environmental protection, and the strategic planning of long-term development of the enterprise. A key point is firmly grasped—the cultivation and application of green management ideology, change passivity into initiative, actively control the environmental protection cost in the production cost, refine the enterprise green culture management, and do not be eager for quick success and instant benefit, only pursue short-term immediate interests, and lose the opportunity to obtain greater long-term interests. What entrepreneurs should think about is how to realize the benign and sustainable development of enterprises themselves? If enterprises want to realize standardization in production activities, they need to have a set of perfect

management rules, and the rules will form a system when they are implemented. If entrepreneurs want their enterprises to achieve sound and sustainable development, they must have a set of sound rules. Only the awareness of green culture management is not enough. They must be applied to the scarf of action in order to play a role.

3.4. Current Situation of Environmental Governance. The environmental data of Shanxi Province are taken as an example.

The number of environmental protection departments and staff is increasing. The number of environmental protection departments and the number of personnel in the environmental protection system can reflect a region's attention to environmental governance from one side. To strengthen the task of environmental governance in Shanxi, environmental degradation is improved and protection management is promoted, and the number of protection institutions above the county level in Shanxi Province has gradually increased since 2006. By 2016, the number of protection departments above the county level in Shanxi Province had reached 792; the number of protection system personnel in the province is 13165 as shown in Figure 4.

The overall investment in emission control projects is increasing. From 2006 to 2017, the investment in the completion of emission control projects in Shanxi Province showed an increasing trend. In 2006, the investment in emission control in Shanxi Province was 33.54 billion yuan, and it then gradually increased. By 2016, the investment in industrial emission and the number of projects reached a record 52.58 billion yuan, ranking first in previous years, but the investment in 2017 decreased slightly as shown in Figure 5.

From 2000 to 2017, the total amount of major emissions in Shanxi Province was gradually reduced, and the emission standard rate of major emissions was rising. From 2006 to 2017, the comprehensive utilization capacity of garbage and the treatment capacity of domestic garbage in Shanxi Province were also improved with the increase in environmental governance. All these show that in recent years, the intensity of environmental governance in Shanxi Province has indeed shown an upward trend as shown in Figure 6.

From the perspective of industrial wastewater discharge, generally, the wastewater discharge was high from 2000 to 2014. Since 2014, wastewater discharge has decreased significantly year by year. In particular, after 2016, the discharge of industrial wastewater has reached a new low. It proves that the current environmental protection work of industrial wastewater discharge cover is done well as shown in Figure 7.

Between 2000 and 2017, sulfur dioxide emissions are divided by 2011. Until 2011, sulfur dioxide emissions have been high and occasionally decreased in individual years, but the overall trend is upward, but after 2011 sulfur dioxide emissions continued to decline, especially after 2015, with a rapid decline of nearly 400000 tons of sulfur dioxide emissions in one year as shown in Figure 8.
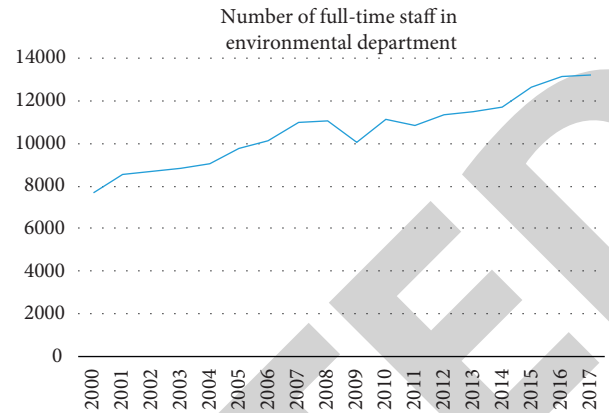
Figure 4: Number of full-time personnel in the environmental department.
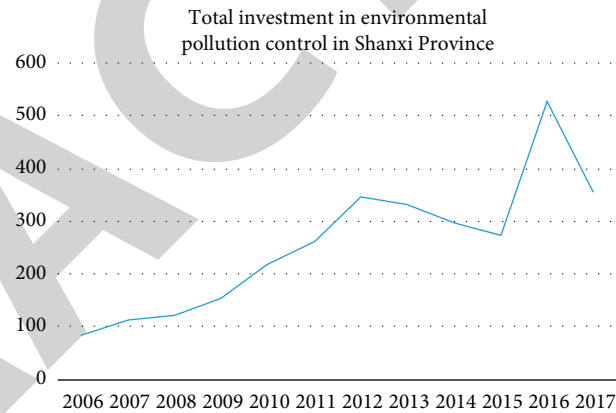
Figure 5: Total investment in environmental pollution control in Shanxi Province.
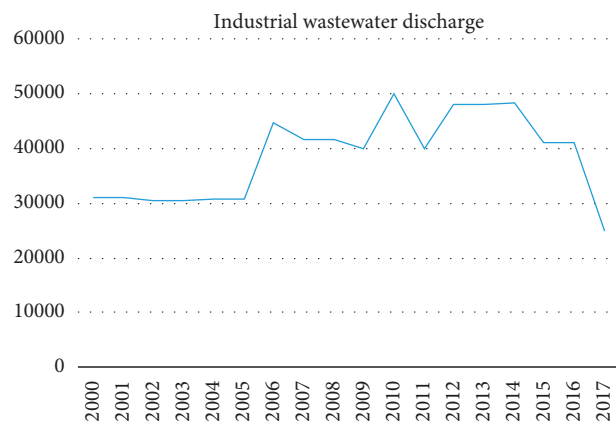
Figure 6: Industrial wastewater discharge (10000 tons).

From 2006 to 2017, the harmless treatment rate of domestic waste in Shanxi Province has always maintained an upward state. It can be seen that the harmless treatment of domestic waste in China is developing and progressing as a whole.

Sulfur dioxide emissions
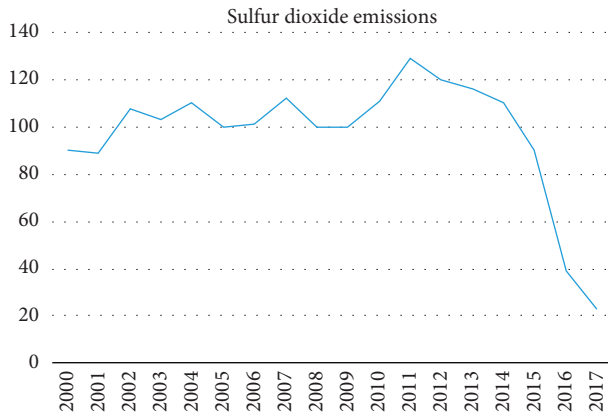
FIGURE 7: Sulfur dioxide emission (10000 tons).

Harmless treatment rate of MSW
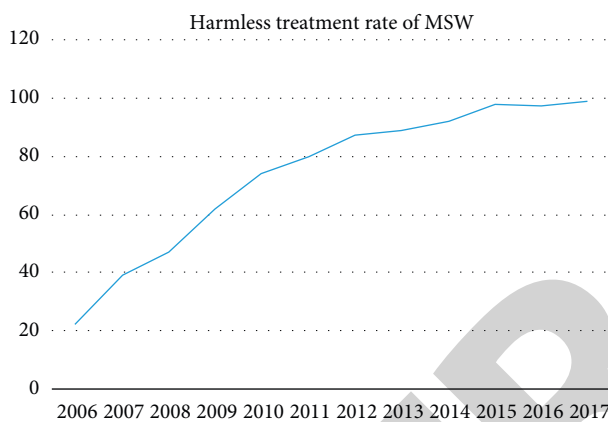
FIGURE 8: Harmless treatment rate of domestic waste.

4. Suggestions on Strengthening Coordinated Environmental Governance

4.1. Maintain Appropriate Mandatory Environmental Regulation and Gradually Improve the Construction of Market-Oriented and Public Participation Environmental Regulation Systems. Because the mandatory environmental regulation emphasizes the punishment of environmental governance, the moderate intensity of environmental regulation has a positive role in promoting the green innovation of enterprises. However, when the regulation is too strict and the governance cost is too high, it may lead to the negative governance attitude of enterprises, but it violates the original intention of the mandatory environmental regulation system. In the future regulation construction, we should provide reasonable guarantee for the channel of public advice and suggestions, to urge enterprises to take the initiative in environmental construction under the pressure of public opinion supervision. Perfect environmental regulation plays a positive role in promoting sustainable economic development. According to relevant research, effective and standardized environmental regulation will have a positive impact on enterprise technological innovation. Perfect environmental protection incentive mechanism can encourage industrial enterprises to innovate. A green technology

innovation system is established with enterprises as units and industrial enterprises are urged to invest in technological innovation, so that industrial enterprises can obtain competitive advantages and occupy the commanding height of competition. Adhering to innovation leading and deeply implementing the innovation-driven development strategy, the government and enterprises should take scientific and technological innovation as the first driving force to lead industrial development. By strengthening environmental regulation, enterprise technological innovation is stimulated and production efficiency is improved, to walk in the front of the production industry. At the same time, in the environment of industrial structure reform and transformation, environmental regulation tools must also be improved. In addition to strengthening command-based environmental regulation means, we should also combine market-oriented environmental regulation and administrative environmental regulation, such as closely combining environmental tax, emission tax, and emission trading system, and adopt diversified environmental regulation tools to improve the status of laws and regulations in industrial production.

4.2. Strengthen the Information Transmission Function of Media Environment and Realize Multi-Agent Collaborative Governance. The increase in media attention to enterprises can not only urge enterprises to improve their external environmental performance to meet the regulatory requirements but also promote enterprises to actively carry out green innovation and cut off the source of environmental pollution from the root. The positive regulatory effect of media attention on environmental regulation and enterprise economic performance shows that media attention expands the "win-win" effect of simultaneous growth of environmental and economic benefits. Therefore, in the future environmental construction, the government and the public should pay more attention to the transmission function of media to environmental information and reputation transmission mechanism, give full play to the information media role of media, and realize the formal governance model of multi-agent participation in environmental governance. The government's environmental regulation is strengthened and a sound environmental information disclosure system is established. The government plays a leading role in environmental governance, but due to the inconsistency of interest objectives between the central and local governments, local governments may choose to ignore environmental pollution and give priority to the development of regional economy. Information asymmetry also provides a possible space for local governments to weaken the implementation of environmental policies. Therefore, it is necessary to establish a sound local government information disclosure system and earnestly implement the inclusion of environmental performance into the performance evaluation of officials, to effectively supervise the implementation of local government environmental policies and strengthen the government's environmental regulation. At the same time, the central government can also establish cooperative relations with environmental protection social

organizations, give play to the effective supervision role of environmental protection social organizations, and use various pressures to ensure the effective implementation of environmental policies of local governments.

4.3. Strengthen Government Guidance.

At this stage, China attaches great importance to environmental protection, and green development has become an inevitable requirement for building a modern economic system. Relevant systems are reformed, relevant regulations are improved, and high-quality development and environmental protection are coordinated and promoted. In the face of the increasing shortage of resources and the aggravation of environmental pollution, the environmental protection department should formulate industrial plans to implement environmental improvement. It cannot simply and roughly achieve one size fits all. It should correctly guide industrial enterprises to develop in the direction of resource-saving and environment-friendly. The coordinated development of modern environmental policy is based on environment and economy. Promoting the coordinated development of economy and environment is not only related to the effective implementation of regulatory policy but also related to the implementation efficiency of laws and policies. Enhancing the effect of environmental regulation is very important for industrial green development. Relevant functional departments should strengthen the compulsion of environmental regulation, ensure the implementation of environmental regulation from formulation to implementation, supervise and urge the implementation of the work of departments at all levels in the process of environmental regulation, guide and supervise the behavior of industrial enterprises, and give certain punishment measures in case of noncompliance. In terms of specific measures, first, environmental governance training is strengthened. We should not only carry out environmental governance training for enterprise leaders but also carry out in-depth training on environmental protection laws and regulations for local enterprise managers and employees, to enable the people to establish environmental protection awareness and green production awareness and urge enterprises to take the initiative to bear social responsibility. Secondly, local governments can innovate guidance methods and introduce enterprises to participate in environmental governance. Local governments estimate the participation of enterprises in environmental protection actions by combining administrative guidance, and attention should be paid to the smoothness of channels in the process of strengthening market supervision, to increase the enthusiasm of enterprises to participate in environmental governance. Finally, enterprises link interests with social responsibility. Local government departments should support and guide enterprises to comprehensively carry out environmental labeling product certification, establish a corporate image, and link corporate interests with social responsibility, to improve the motivation of enterprises to participate in environmental protection governance.

4.4. Enterprises Should Change Their Development Ideas and Promote the Transformation and Upgrading of Enterprises.

With the development of the times and the increasing requirements of environmental protection, the traditional development concept needs to be updated. At present, China has entered the new normal period of economy. Adjustment, transformation, and upgrading have become the keywords of this era. Industrial transformation and upgrading are an important issue in this period. If enterprises want to adjust their traditional development concept, they cannot take economic interests as a single goal, nor can they take the environment as the price of economic development. On the one hand, enterprises can develop their low-end industrial chain into high-end industrial chain. Enterprises can extend their own industrial chain and promote the development of the whole industrial chain in the direction of low energy consumption and low pollution. The investment of enterprises cannot be limited to the production range of the original enterprise, but also invest in emerging investment fields and expand their own investment fields. It not only promotes the improvement of the overall income of the enterprise but also improves the anti-risk ability of the enterprise. On the other hand, industrial enterprises can change the traditional process, upgrade the process flow and production equipment, reduce pollution emissions, adopt more advanced energy-saving technology, improve the added value of products, and promote the transformation and upgrading of industrial enterprises and realize green development in these ways. The subjective initiative of green transformation of enterprises is stimulated and actively guided to carry out green production. Enterprises are the main source of pollutant emissions. How to strengthen and guide the green transformation of enterprises should be a key issue in environmental governance. Government departments should strengthen the incentive of enterprises' environmental protection behavior, help enterprises realize green production, and provide financial subsidies and more social resources to enterprises that realize green transformation, to effectively stimulate the subjective initiative of enterprises' green transformation. In addition, environmental protection social organizations can also establish cooperative relations with enterprises, use their professional advantages to provide support for the green transformation of enterprises, and use their advantageous position in the public to publicize the products of green transformation enterprises, guide consumers to buy green products, and improve the competitiveness of enterprises, to stimulate enterprises to have more power of green transformation.

(1) Strengthen the Cultivation and Accumulation of Human Capital. Human resources are the internal driving force for the survival and development of modern enterprises and an important basis for the sustainable development of enterprises. Now, all provinces have vigorously implemented the talent development strategy, seized talent resources, and accelerated the establishment and improvement of the innovation system. While cultivating their core innovation strength, enterprises should also establish their own talent introduction policies and vigorously introduce

innovative talents from various universities and research institutes. We should cultivate our own talents in some key fields and links related to enterprise development. (2) Enterprises should vigorously promote the transformation of scientific and technological achievements, protect the legitimate rights and interests of legitimate owners, establish a long-term incentive mechanism, and promote enterprises' continuous innovation. (3) We should establish an innovation atmosphere for enterprises and encourage innovation. Innovation should not only stay at the slogan level of the enterprise but also should become the consensus spirit of the enterprise. Innovation should become the core concept and core culture of the enterprise and go deep into everyone's heart.

4.5. Enterprises Should Improve Their Sense of Social Responsibility. Corporate responsibility cannot be missing in any period. Industrial enterprises bear great responsibility in the process of environmental regulation. The fulfillment of social responsibility by industrial enterprises is the key to ensure the normal operation of the economic market and the sustainable green development of enterprise activities. Enterprises should not only improve the quality of products but also establish a good brand image. First of all, enterprises should establish a perfect internal supervision mechanism in production activities to prevent pollution loopholes. Enterprises should not only control the environmental protection standards of production methods or raw materials at the source of production but also ensure that products meet the standards, make more use of clean technology, and improve the green quality of products. Secondly, industrial enterprises should actively respond to the government's environmental protection policies, such as actively cooperating with the government's legal implementation, actively cooperating with other enterprises, and demanding themselves with higher environmental regulation standards in the process. In the process of development, heavily polluting enterprises will inevitably have a negative impact on their corporate image, and enterprises that make outstanding contributions to environmental protection can win the favor of the market. Enterprises can improve their sense of responsibility from the aspects of product concept, sales mode, and production capacity, to realize the unified development of enterprise economic growth, social environment, and natural environment. The future of society is also the future of enterprises. The better the corporate social responsibility is, the more conducive to the implementation of environmental regulation and the green development of enterprises.

5. Conclusion

It is undeniable that in the process of environmental governance improvement, the coordination of multiple governance subjects and social groups is essentially important. The restriction and running in of the relationship between the main bodies such as organizations, citizens, and government are a problem that needs long-term attention. Straightening out the division of labor and relations among

various subjects in the process of collaborative governance is not an overnight process. However, we should also note that collaborative governance of the environment is an inevitable choice to meet the social needs and respond to the needs of citizens. Collaborative governance is the result of the continuous socialization of public management functions in contemporary society, which means not only the continuous decentralization of governance authority but also the complete transformation of the government's governance concept and economic development mode. This means that in the process of traditional public management, the "top-down" management mode of society and market marginalization and pure government as the center is changing into a new governance model, which means that the original concept of seeking development at the expense of the environment will also be completely changed under the new environmental governance model; that is, the market, society, and citizens are the main participants and take a strong government as the core and leadership. Coordination and cooperation are maintained with each other and worked together to maximize the benefits of environmental protection affairs and improve the quality and efficiency of public environmental services. Therefore, overcoming the obstacles in the process of collaborative environmental governance requires the cooperation of various principles, systems, and process management, so that different stakeholders can establish a relationship of mutual trust, mutual reliance, and mutual understanding under their governance capabilities.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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Research Article

The Positioning of Mental Health Education in Social Work under the Healthy China Strategy

Xiao Wang and Manyi Gu [ORCID]

Southwest Medical University, School of Humanities and Management, Luzhou, Sichuan 646000, China

Correspondence should be addressed to Manyi Gu; gumanyi@swmu.edu.cn

In recent years, the world mental health movement has developed rapidly, and people are paying more and more attention to mental health. China has clearly put forward the major task of comprehensively promoting the construction of a Healthy China and building a Healthy China by 2035. However, in contrast, the research on mental health in Western countries started earlier than in my country, and for a long period of time, my country has followed the research results of Western mental health ideas. Every different culture has its own unique psychological content. Due to factors such as values, habitual behavior, region, and cultural background, it is necessary to deeply explore the mental health thought resources in Chinese culture and study the mental health thought in Chinese culture. It provides new directions and ideas for our country's psychological counseling and treatment, as well as mental health education and ideological and political education. This article starts from the basic concept of mental health education and sorts out the current research status at home and abroad. By analyzing the main ideas of mental health education work in the context of Healthy China, it explores the positioning of mental health education in social work, and finally, on the basis of strengthening the combination of Chinese culture and mental health thinking, making full use of localized mental health thought and applying it to practice, and drawing inspiration for the study of mental health thought in Chinese culture.

1. Introduction

Health is the basis of human survival and development, and it is the basic premise for people to achieve happiness. The national health level is also an important part of the national comprehensive national strength and national competitiveness and is an important strategic factor affecting the country's social and economic development [1]. The Proposal of the Fifth Plenary Session of the 19th CPC Central Committee on the formulation of the 14th Five-Year Plan for National Economic and Social Development and the Two-O Five-Year Vision Plan (hereinafter referred to as the Proposal) clearly proposes the major tasks of comprehensively promoting the construction of a Healthy China and building a Healthy China by 2035. The Healthy China strategy is a major strategic project designed to improve people's livelihood and is also a requirement and important part of China's socialist modernization. The implementation of the Healthy China strategy requires the concept of "people's health" running through the national development plan, realizes cross-departmental and cross-field cooperation and exchanges, and continuously promotes the concept of Healthy China in the process of realizing coconstruction and sharing by all people [2]. Thus it can be seen that the Healthy China strategy is not only lofty but also has rich connotation and has strong research significance. This is a major strategic plan made by the CPC Central Committee with Comrade Xi Jinping at its core to review the overall situation and assess the situation. Comprehensively promoting Healthy China construction fully embodies the development of the people-centered thought, is the relationship global strategic task of socialist modernization construction, is the inherent requirement of guarantee people enjoy a happy life, is the important security of national public security, to open the comprehensive construction of modern socialist country new journey, promotes

the development of the new era of health quality, and realizes that the great rejuvenation of the Chinese nation the Chinese dream has great historical significance and practical significance [2].

Mental health is of great significance for individuals to promote their health and develop a healthy lifestyle. We believe that mental health refers to a set of concept systems about disease prevention, maintaining health, and striving to achieve the best state of life, which is the firmly believed concept of healthy life [3]. It contains an individual's view on what health is, the importance of health, factors affecting individual health, and ways to improve health. Individuals with different mental health can lead to different health behaviors, lifestyles, and health conditions. Social development is getting faster and faster, the competition is becoming more and more fierce, and the threat of psychological problems to health has been far greater than physical diseases. Health is an inevitable requirement for promoting the all-round development of human beings, a basic condition for economic and social development, an important symbol of the prosperity of the nation and national prosperity, and the common pursuit of the broad masses of the people. Therefore, in the context of the health China strategy, it is particularly important to study the positioning and role of mental health education in the overall health China strategy. This article aims to start with the meaning, classification, and goal of mental health education, analyze the problems of mental health in the overall background of Healthy China, and propose the improvement and countermeasures of mental health education, in order to improve the role of mental health education [3].

2. Mental Health Education

2.1. Meaning of Mental Health Education. Mental health education, according to the law of people's psychological activities, takes various methods and measures, mobilizes all internal and external positive factors, maintains individual mental health, and cultivates good psychological quality to promote the overall quality of education [4]. Mental health education is a new education concept, a new education model, and a multidimensional and multilevel education system. We can make the following analysis of its rich connotation.

From the perspective of content, mental health education includes two parts: psychological quality training and mental health maintenance [5]. Psychological quality is a relatively stable psychological characteristics, attributes, or qualities produced and developed in the interaction between individuals and the objective outside world on an innate basis, which is mainly composed of the combination of intellectual and nonintellectual factors [4]. The psychological quality of individuals reflects the development level of their psychological function, which determines the effect of individual intellectual activities but also determines the difficulty and level of individual social adaptation. Psychological quality plays an important and unique role in the three basic human qualities (physical quality, psychological quality, and social and cultural quality). The fundamental

purpose of cultivating psychological quality is to promote the comprehensive development of people's quality. Only the comprehensive development of quality can have the development of a sound personality [6]. Figure 1 gives the causes of psychological stress in college students, and it can be seen that the stress factors of mental health are diverse, as shown in Figure 1 [5].

The maintenance of mental health is mainly to make individuals form and maintain a normal psychological state so as to adapt to the society, normal growth, and development [6, 7]. Specifically, one is to help people form self-regulation ability and maintain a normal psychological state; two to help the bad psychological state of people to restore normal state; three is to help psychologically unhealthy people to restore healthy state [7]. These two aspects of mental health education reflect the different levels of people's normal growth and development. Psychological quality training is mainly to make people can succeed and become talented; mental health maintenance is mainly to enable people to grow and develop normally, can adapt to the society, and can grow into healthy adults throughout the whole life growth stage of the mental health education system, as shown in Figure 2.

2.2. Classification of Mental Health Education. According to the different nature of mental health education, mental health education can be mainly divided into two categories: one is developmental education and the other is remedial education [7, 8].

Developmental education mainly refers to the process of psychological counseling personnel on the basis of understanding the general laws of individual psychological development, giving certain education and counseling for the tasks faced by people at different stages so as to properly solve their psychological contradictions and give full play to their psychological potential, so as to promote the smooth development of their physical and mental health. This is a kind of routine, preventive, and improving education; the object of education is the normal development of the people [7, 9].

Remedial education refers to the process in which psychological education cannot play a role; psychological counseling personnel give direct guidance and help to the problems in study, life, and adaptation, to diagnose and correct the relevant psychological disorders or minor mental diseases. This is a kind of corrective education, and the object of education is the people with psychological problems of different degrees [10].

2.3. Objectives of Mental Health Education. In recent years, China has made great achievements in the theoretical research and practice of mental health education and accumulated rich experience, but there is a lack of systematic research on the target system, especially the target content. The goal of mental health education is the guidance and basic basis of carrying out mental health education, which is the prerequisite for the correct and effective implementation
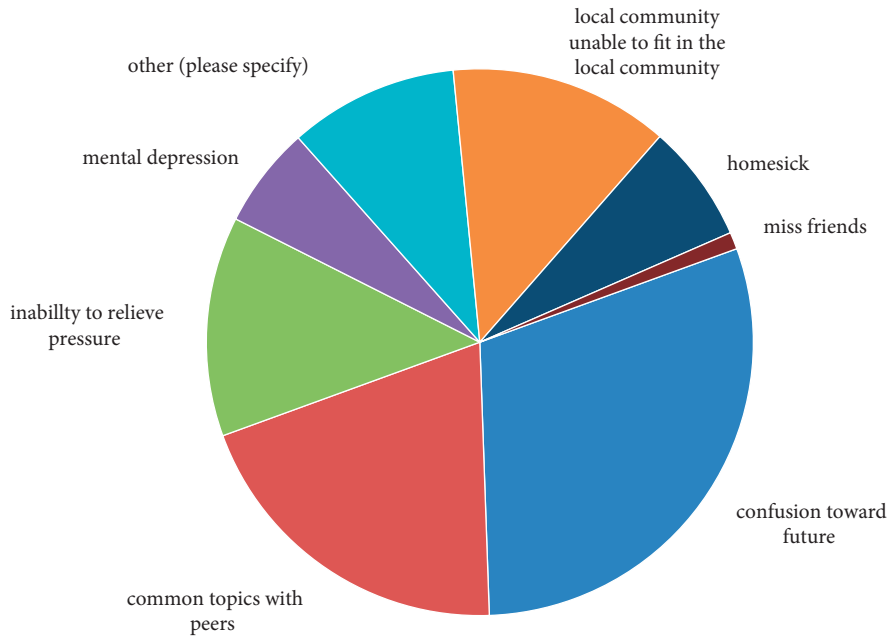
FIGURE 1: Mental health education throughout the education stage.
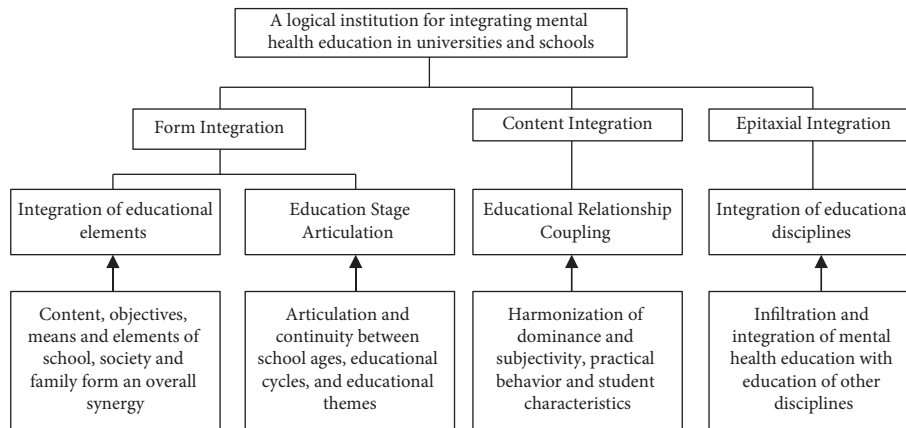
FIGURE 2: Mental health education throughout the whole education stage.

of mental health education and is also a key link of mental health education planning [11].

The goals of mental health education can be divided into different types. According to the abstraction of the goal, it can be divided into general goal or specific goal [10]. According to the level of goals, it can be divided into primary goals, intermediate goals, and advanced goals. The overall goal of mental health education should reflect the basic requirements of mental health education and meet the requirements of educational training goals. Therefore, the general goal of mental health education can be summarized as follows: through mental health education, improving people's psychological quality, developing people's potential, cultivating people's optimistic psychological quality, relieving psychological confusion, and promoting the sound development of people's personality. The general goal of people's mental health education can be determined according to the task or the main staged topic to be solved.

From the perspective of the goal level, the primary goal is to prevent and treat mental illness, the intermediate goal is to improve psychological adjustment, and the final goal is to promote psychological development.

2.4. Status and Function of Mental Health Education

2.4.1. Mental Health Education Plays an Essential Role in the Development of Modern Education. From the perspective of dynamic balance, some scholars have proposed that mental health is essentially a process, and it is the normal operation of the balancing mechanism of the automatic adjustment of the psychological system. Some scholars believe that mental health is a necessary part of a person's overall health and is a continuous mental state. In this state, individuals have a vitality of life, positive inner experience, and good social adaptation. To give full play to the physical and mental

potential and positive social functions of individuals, modern education is transforming the traditional education mode of imparting knowledge into a scientific education mode; the test-oriented education mode is transformed into a quality education mode. The fundamental purpose of quality education is to comprehensively improve the quality of all students. Quality education is based on physical quality education and psychological quality education, and psychological quality is the basic component of social and cultural quality. Psychological education is not only narrow mental health education but also psychological quality education. Psychological education plays a dominant role in the harmonious development of personality. Intelligence in psychological quality is an important basis for learning knowledge, and it needs to be the inner driving force of human development. Personality and self-awareness affect people's learning style and cultural structure. Psychological quality is the basic component of social and cultural quality, as shown in Table 1.

2.4.2. Mental Health Education Occupies a Dominant Position in the Harmonious Development of Personality. In the process of individual socialization, the harmonious development of personality constitutes the core component of the overall quality. The criteria of personality health include at least three aspects: good realistic perception, a good understanding of self, and a positive attitude towards life [12]. A person with a healthy personality can correctly understand the real environment, have appropriate behavior and emotional response, have a good interpersonal relationship, can be self-pleasing, have basic accurate self-expression cognition and no inferiority, and can adjust and control your emotions; able to face life with a positive attitude, dare to bear setbacks, dare to overcome difficulties, and have good behavior. Such students can effectively conduct learning activities. A healthy personality is a basis for forming a good moral character, which is closely related to the efficiency of intellectual activities and is beneficial to promoting the development of physical health and aesthetic education. It is involved in the process of individual socialization adapted to modern society. It is the main task of psychological education in colleges and universities to help students develop their personality harmoniously by means of psychological counseling and psychological counseling, and traditional education is just ignored in this important aspect [13].

2.4.3. Mental Health Education Plays a Leading Role in Developing Human Potential. The development of human potential is based on two aspects of accumulation: one is the genetic quality of human life evolution: the other is the spiritual wealth of human social practice and the "inheritance" of spiritual wealth is the sacred mission of education [14]. Education enables future generations to stand on the shoulders of their predecessors as soon as possible and promote the better development of human society. Developing people's potential is one of the purposes of quality education, which requires the professional knowledge and

methods of psychological education and cannot be simply included in ordinary teaching. Every student is a talent whose potential remains to be developed. The key is to let each student understand his own intellectual structure and the corresponding means of development through the means of psychological education. There is a basic contradiction between adaptation and development, and the imbalance of this contradictory relationship will inevitably lead to mental health [15]. Psychological education focuses on the development of students' potential so as to drive the overall progress of students [12].

3. Mental Health Education at Home and Abroad

Internationally, humankind is in a period of great development, reform, and adjustment, where countries are interconnected and interdependent, and the world has a common destiny. When it comes to "mental health," it is a product from the West. As early as the end of the 19th century, the Western traditional culture, which advocated scientism and humanism, specially studied "psychology" as a science [16]. In contrast, the scientific research on mental health in China does lag far behind. However, Chinese culture has long contained rich mental health ideas. Chinese culture provides a lot of valuable exploration and thinking about people's inner life, and Chinese culture carries a kind of reflexive knowledge. Although it has no specific psychological part in it, it contains many mental health thoughts and special ways of cultivating morality, strongly permeates the psychological customs of Chinese society, and constructs the unique psychological lifestyle in the Chinese cultural background [14].

3.1. Foreign Mental Health Research. The theoretical research and practice related to health concepts and health strategies in Western countries all started earlier. In the past half a century, the research content has been extended from the connotation and value of health and health fairness to the value of a healthy lifestyle, and the focus of health national strategy has also undergone many adjustments and improvements. Psychology originated in the West and in itself is rooted in Western culture. Various schools and theories of Western psychology reflect Western values and Western cultural values and have a strong Western cultural color [17]. Western psychology tries to follow and imitate the relatively mature natural science and then with the hegemony of the American psychology is their psychological knowledge system; this research is universal and applicable and is found to be the only applicable psychological system beyond the local culture [18].

These research results and experience abroad have provided us with rich information. Under the background of the current market economy construction, the mental health of the Chinese people is particularly important. For foreign experience and conclusions, we must choose to absorb and learn from it, take its essence, and discard its dross. This requires us to explore the localization of mental health

TABLE 1: Correlations between mental health factors and healthy living.

	Moral cultivation 4.07 (0.59)	Healthy behavior 4.42 (0.43)	No signs of disease 3.76 (0.66)	Adapt and enjoy 3.98 (0.58)	M (SD)
Health responsibility	0.27**	0.10	0.34**	0.28**	2.38 (0.61)
Self-actualization	0.40**	0.36**	0.40**	0.39**	2.96 (0.55)
Interpersonal relationship	0.34**	0.32**	0.38**	0.34**	2.87 (0.49)
Stress coping	0.34**	0.33**	0.39**	0.38**	2.88 (0.54)
Nutrition	0.32**	0.27**	0.40**	0.31**	2.71 (0.56)
Sports	0.2**	0.22**	0.40**	0.31**	2.67 (0.70)
Health promotion lifestyle total score	0.37**	0.29**	0.44**	0.38**	2.74 (0.51)

thought in China by reasonably using the successful experience of mental health model in Western countries [15].

3.2. Domestic Mental Health Education.

Chinese psychologists have long realized the importance of localization. As early as 1920, sociologist Yang Kaidao pointed out that one of the major flaws in Chinese social sciences was the blind use of foreign materials while ignoring domestic materials. Mental health thought is subordinate to psychology and is a branch of psychology. Research on mental health thought is also an important part of psychology research content; with the development of psychological localization, many scholars also explore the localization of mental health thought; in the localization of mental health thought, most scholars have followed the perspective of Chinese culture and the mental health thoughts in Chinese culture and analysis and also obtained many results. Shen Xiaomei believed that "mental health education is the use of modern educational methods by educators to help people understand the world beautifully, master psychological knowledge, analyze the causes of psychological problems, and prevent the occurrence of psychological problems, so as to improve their ability to understand themselves and promote physical and mental health." In terms of the process of healthy growth, Wu Qiang believed that strengthening mental health education is the need for the development of the Internet era and the need to solve the psychological problems of college students.

Chinese psychologists began to gradually realize the positive influence of mental health thought in Chinese culture on the development of modern psychological science and made efforts to promote the development of the localization of mental health thought [19]. By reading a large amount of literature, it can be concluded that there are two main tendencies of various scholars: one is to completely deny the Western mental health idea and abandon Western psychology; the second is that the theoretical framework of Western scientific psychology when based on traditional culture. This article states that the first tendency exaggerates the role of Chinese culture, while the second view takes the essence of Chinese culture and Western mental health thought and discards its dross, which is more in line with the requirements of cultural innovation, more scientific and more in line with the reality [16].

In general, the research on the localization of mental health thoughts in China has been developing. The main research includes the exploration and arrangement of mental health thoughts in Chinese culture and the research on the unique psychological behavior of Chinese people since the late 1980s [20]. Localization of mental health thought research as part of the localization of psychology, and psychology localization is still in its infancy, mainly manifested in "the goal, strategy, and means to achieve the goal is still not clear, there is no unified program of action, not beyond the plight of localization and globalization." That is to say, the research work on the localization of mental health thought in China is still in the initial stage, but it is undeniable that the localization of mental health thought in China has been developing [17].

3.3. The Healthy China Strategy.

As an important social cause and people's livelihood project in the new era, the construction of Healthy China must provide concept first and lead its development with correct ideas. According to the 19th report "for the people to provide a full cycle health services" and "prevention first" spirit, and the deepening of the law of health medicine development and health national strategy international experience, we put forward the three basic ideas of the construction of Healthy China—health concept, health concept, and the concept of prevention first. The 2030 phase targets of the Healthy China Initiative are shown in Figure 3.

3.3.1. The Concept of the Right to Health.

Health is the basic demand and necessary condition for individual survival and development, and it is also the most important value orientation of human society. A person's health condition will directly affect his income ability and living standard and then affect the realization of his social and economic rights. Therefore, the right to health is regarded by the natural law school as an innate and irresistible basic human right, which is the basic premise of maintaining a better life for citizens. The right to health, as a basic human right, has long been protected by law in history. The right to health means health equity; that is, everyone has an equal right to health, which requires the state to assume the responsibility and obligation to protect people's health rights and interests and health equity. The right to health imposes three levels: the government to protect the right to health from the civil right, the government, and the right to respect every citizen's right to health from the political right. Under the Healthy China grand strategy, the national planning of mental health education for residents at the social level is shown in Figure 4.
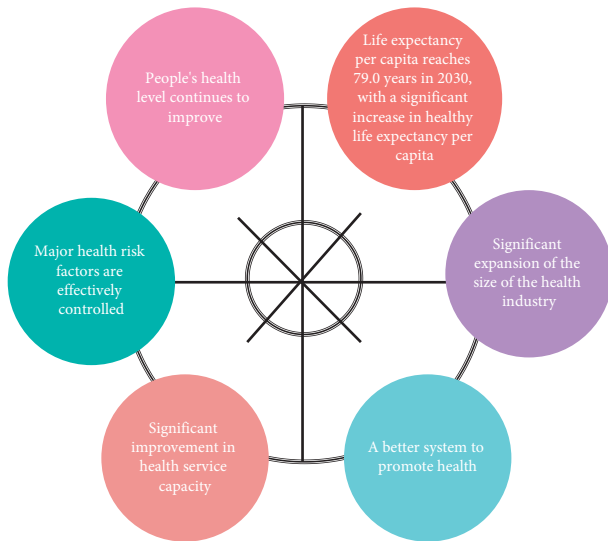
Figure 3: The Healthy China action plan.

Figure 4: The Healthy China action plan.

3.3.2. Big Health Concept. The report to the 19th National Congress of the Communist Party of China and the Outline of the "Healthy China 2030" Plan both advocates that building a Healthy China should focus on improving people's health, accelerate the transformation of the development mode in the health field, and maintain and protect people's health in an all-round and whole-cycle way. This is essentially advocating a new health concept—big health. "Great health" is the expansion and sublimation of the concept of "health." Different from the traditional understanding of "no disease of the body is healthy," "great health" pursues comprehensive health, including body, spirit, psychology, physiology, society, environment, and other aspects. It is a global concept put forward according to the development of the times, social needs, and changes in disease spectrum [18]. It focuses on human birth, aging, illness, and death, pays attention to various risk factors affecting health, and advocates self-health management and health environment management so as to reduce disease risks and promote the improvement of people's health levels. From the perspective of the areas of Healthy China, the core connotation of big health is as follows: the whole life cycle health covering the whole population, that is, the whole process of "from negative one year to life," including gestation (maternal), childhood, adulthood, old age, and hospice care; the comprehensive health covering the whole population, that is, physical health, mental health, social adaptation health, lifestyle health, and living environment health. Mental health education is an important part of the big health concept, as shown in Figure 5.

3.3.3. Prevention First Concept. The report to the 19th National Congress of the CPC proposed "putting prevention first and combining prevention and control," which is based on the deepening of the understanding of the development laws in the health field. "Prevention first" concept under the guidance of health maintenance focuses on preventing and
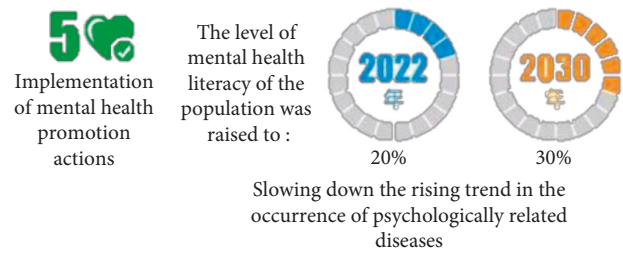
reducing the occurrence of disease to reduce the cost of Healthy China construction and improve people's happiness and has positive effects, both health and economic effects. Healthy China construction should always adhere to the basic concept and must be implemented in all aspects of the construction of Healthy China. In the popularization of a healthy life, more attention should be paid to the prevention and health care effects of physical fitness, strengthen health education, and improve the health literacy of all the people; in optimizing health services, attention should be paid to the disease prevention and control of comprehensive chronic diseases and health management and promote the equalization of basic public health services [19].

4. Countermeasures and Suggestions for Mental Health Education

4.1. The Current Challenges of Social and Mental Health. In 2020, the COVID-19 outbreak and epidemic around the world. China made full use of its significant advantages of concentrating resources to accomplish great tasks, gathered all social forces to fight the epidemic, and introduced a series of strong policies and measures [20]. Zone spreading work mechanisms of the State Council have issued the notice of coronavirus pneumonia epidemic emergency psychological crisis intervention guidelines notice, the notice about setting up the outbreak psychological assistance hotline, and printing COVID-19 epidemic psychological counseling work plan notice, guidance around different periods, different groups of psychological counseling, and crisis intervention work. It can be seen that psychological work has been raised to an unprecedented height in response to the epidemic. According to the Chinese report on national mental health development, the pressure on national mental health is increasing rapidly, as shown in Figure 6.

The phased assessment of mental health education on China's social psychological service system construction is also a challenge to China's social governance capacity. Under the current epidemic, the Chinese people of all ethnic groups have worked together in times of trouble, fully demonstrating the Chinese nation: the patriotic feelings of integrating the country, the spirit of mutual assistance from all sides, and the indomitable character of perseverance. Moreover, at the same time, the public also shows negative emotions and cognitive and behavioral performance such as group panic, confidence crisis, and moral anomie.
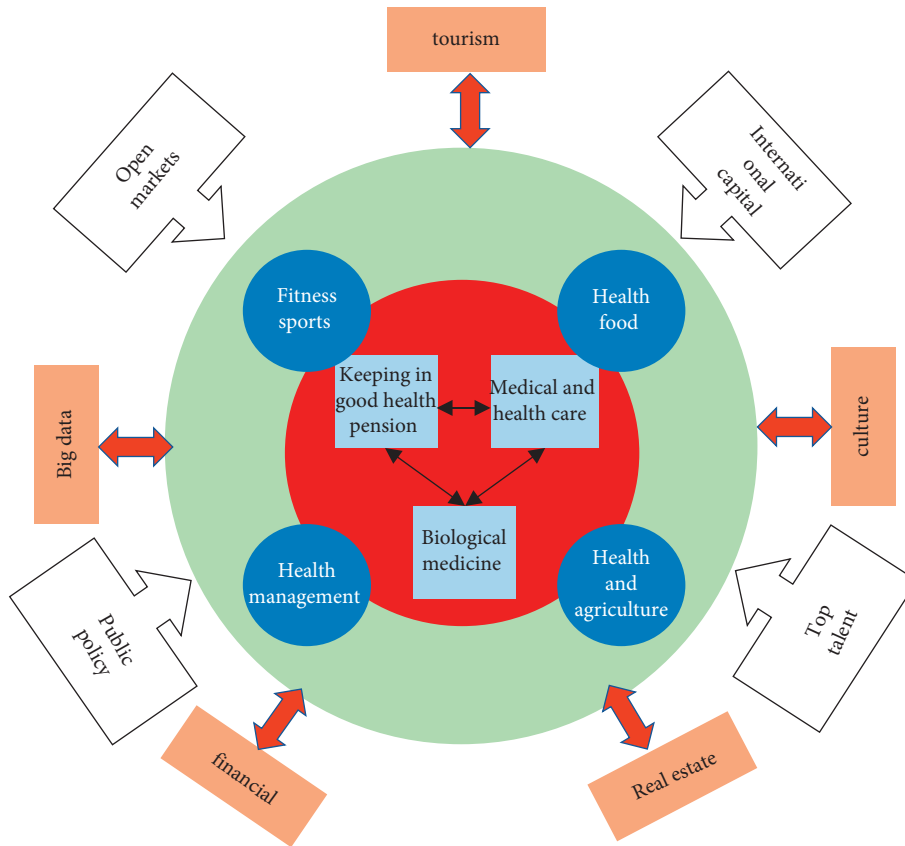
FIGURE 5: Schematic diagram of the large health ecosystem.
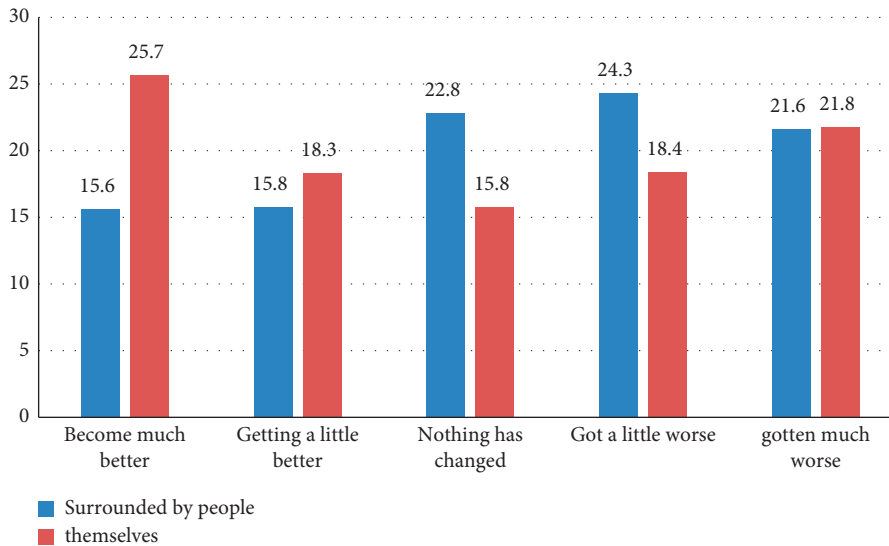
FIGURE 6: Ten years of mental health changes between oneself and the people around you.

4.1.1. Panic: Anxiety and Conformity Behavior. Major epidemics lead to a social state of emergency. The uncertainty, low incidence, and unconventional and rapid response to emergencies can easily lead to individual response failure and some specific response modes. Group panic, which is one of the specific response methods, may be emotional, such as anxiety, fear, powerlessness, and behavior, and may

be conformity, panic, at a loss. The mental health of different ages is not identical, as shown in Figure 7.

4.1.2. Crisis of Confidence: Overload of Information and Lack of Trust. Modern society is in the era of information explosion. Home isolation does not mean information

isolation but instead makes people spend more time updating epidemic-related information. Through the collection and investigation of relevant data, it is found that 27.7% of the public spend more than 2 hours on epidemic-related information every day, and 39.8% of them update information more than 5 times. However, is more information the better? A striking contrast is that in 2003, when the SARS outbreak broke out, a related survey found that the proportion of the public updating information more than 5 times a day was 17.6%. Mainly based on TV and newspapers, the current channels for people to obtain information are the Internet, traditional newspapers, and TV. Therefore, the self-assessment anxiety level (37.29 points) is much lower than the anxiety level of the respondents under the current epidemic (40.75 points). On the one hand, information overload leads to increased psychological pressure; on the other hand, the degree of trust in various types of information is not high, and this uncertainty further causes panic. According to the results of this survey, the public has an average level of trust in the information of 3.44 points. Among them, the trust in official news and reports is the highest, the trust in the forwarding of messages from relatives and friends is the lowest, and the large websites and social platforms are in the middle. The specific data are shown in Table 2.

4.1.3. Moral Anomie: Egoism and Social Indifference. Disaster will magnify the goodness of society, and it will also amplify the gray of a society. Since the outbreak of the epidemic, it can be seen that the people of the country donated money to the epidemic area, some businessmen embezzled, misappropriated, and delayed some officials to avoid others, and some patients deliberately concealed their trips, resulting in a large number of medical workers are infected. Under the "national system," on the one hand, the concept of one province package one city "united city" is found in some areas. Talk about Hubei color change and even disclose the privacy information of returnees without authorization. These social phenomena have exposed some bad social mentalities to varying degrees.

4.2. Countermeasures and Suggestions to Strengthen Mental Health Education

4.2.1. Improve the Social Service System. Clarify the basic public service orientation of social psychological services, implement the main body responsible for the construction of the social psychological service system, strengthen and improve the top-level design, formulate evaluation indicators, professional norms, and ethical codes for system construction, and coordinate the promotion of system construction. Strengthen the use of big data and cloud computing, and establish a social psychological service steward system. It is necessary to further explore the relevant social psychological indicators included in the government's basic services and scientifically measure the amount of financial support. This can start with some existing measurement indicators and select and supplement relevant

indicators. It is suggested that the National Patriotic Health Campaign Committee should add relevant indicators of social psychological services and take the lead in introducing the relevant indicator system in the evaluation process of healthy cities so as to promote the improvement of the level of urban social psychological services. Of course, in townships and rural areas, different types of measurement index systems may need to be adopted, which requires further research.

4.2.2. Increase Localization Research in Related Disciplines. Vigorously develop related discipline groups represented by health psychology, social psychology, and cultural psychology with Chinese characteristics, and cultivate scientific research and practical talents related to social psychological services. In particular, the research, practice, and talent training of community psychology, policy psychology, big data, and network psychology can be particularly highlighted. At the same time, the relevant research and training in psychology can further penetrate the field of social work, train social workers to master the knowledge and skills of developmental psychology, educational psychology, psychological measurement, psychological counseling, and other related knowledge and skills, improve their professionalism, and provide social psychological services according to the advantages of social work itself. It is suggested that training college counselors, community residents' committees staff, family doctors, people's mediation committee members, and other existing staff should be encouraged, the relevant concept of social psychological services, ethical rules, and practical skills under the unified coordination of the competent unit should be grasped, measures to local conditions to carry out social psychological practice should be adjusted, and the practice of social psychology practice talent reserve can be expanded.

4.2.3. Strengthen the Popularization of Mental Health Education. To strengthen the basic research and scientific popularization of social psychology, the three professional societies can coordinate and form special forces, actively use big data technology and traditional research and measurement technology, and establish a national social mentality database and a national mental health database, to provide data support for the dynamic changes of social mentality and mental health. We can try to construct the social psychological evaluation index such as "China's confidence index" and "national identity index" to comprehensively and accurately measure the effectiveness of community identity construction. At the same time, we should organize professional forces in large and medium campus, enterprises and institutions, urban communities and villages, in various forms of mental health popularization, social mentality, and traditional cultural psychology, inheritance, and innovation activities, let the people in their daily life directly feel professional social psychological services, and improve its subjective happiness, national pride, and cultural self-confidence.
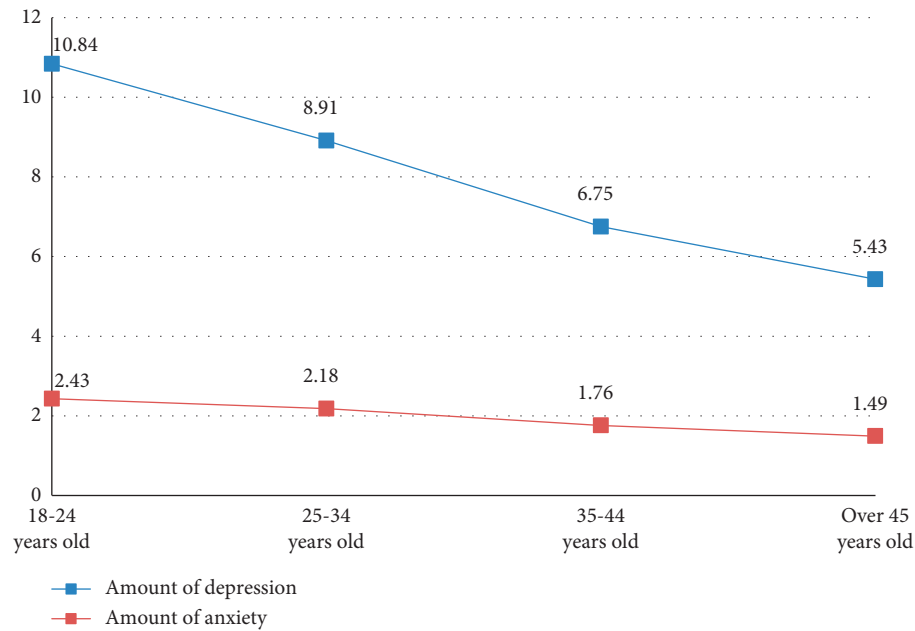
Figure 7: Analysis of mental health at different ages.

Table 2: Public trust in different information channels (1~5 score).

Information channel	Official, media	Large websites	Social, platform	Relatives and friends
Degree of trust	4.34	3.48	3.12	2.83

4.2.4. Mobilize All Social Resources. Expand horizontal resources and mobilize social forces to participate in the construction of a social psychological service system. Establish a linkage mode led by governments at all levels and relevant administrative departments, supported by psychological associations and other industries, and participated by social psychological staff in the implementation, and build a basic and comprehensive social psychological service system with communities at different levels as the practice carrier. Led by the local government, colleges and universities to provide intellectual and talent support, industry society supervision, social institutions to provide support, and the government to promote university and community to establish a unique partnership are the basic development modes of Chinese social psychological services and should focus on scientific and deep evidence-based research, form a professional, multitype, multilevel and sustainable social psychological service system.

5. Conclusion

In the context of the new crown epidemic, our country is indeed facing this severe mental health challenge. Under the guidance and requirements of the Healthy China strategy proposed by the 19th National Congress of the Communist Party of my country, our country must pay attention to the mental health of the people and strengthen the popularization of mental health education. Therefore, this article mainly proposes the following suggestions for the current mental health problems facing our country. The first is to clarify the social orientation and strengthen the psychoeducational function of social public services. The second is to vigorously develop relevant psychological research with Chinese characteristics. The third is to increase the popularization of relevant research and education and finally to actively use the resources of all sectors of society to develop mental health transactions in all aspects.

Data Availability

The labeled dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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Research Article

Analysis on the Policy Environment Influencing Factors of Chinese Environmental Education Development and the Reform Trend in Combination with Environmental Education History

Tao Yu and Manyi Gu (ID)

Southwest Medical University, School of Humanities and Management, Luzhou 646000, Sichuan, China

Correspondence should be addressed to Manyi Gu; gumanyi@swmu.edu.cn

At the turn of the century, facing the challenge of information and technology, environmental education, and talent competition, the world's major environmentally, educationally developed countries have entered the wave of environmental education reform. This was promulgated in 1999, and our country also successively promulgated through "the central committee of the communist party of China under the State Council on deepening environmenta education reform and comprehensively promote quality environmental education decision" in 2001 the "basic teaching environmental education course reform outline (try out)," launched to "deepen the environmental education reform and comprehensively promote quality environmental education" for the purpose of the foundation environmental education course and teaching reform. The curriculum reform is characterized by government leadership, expert guidance, and teacher participation. Its specific approach is top-down, overall promotion, concept guidance, experimental exploration, and gradual expansion, which has achieved a lot of theoretical and practical achievements. However, the practice of more than ten years has proved that the goal of the curriculum reform of basic environmental education has not been safely realized, the classroom has not undergone fundamental changes, and the advanced curriculum concept and curriculum system have not been transformed into advanced classroom teaching practice. This paper mainly discusses the influencing factors of the policy environment of environmental education development in China and analyzes the trend of reform in combination with the history of environmental education. On the one hand, the research of this paper can enrich the research theory of pedagogy; on the other hand, it can provide reference for the practical environmental education reform and have rich significance in theory and practice.

1. Introduction

At the end of the last century, the United States, Britain, Germany, Japan, France, Austria, Canada, and other major environmentally, educationally developed countries as well as many developing countries carried out basic environmental education reform facing the 21st century successively or simultaneously. In 1999 and 2001, China promulgated the "Decision of the CPC Central Committee and The State Council on Deepening environmental education Reform and Comprehensively Promoting Quality-oriented Environmental education," "Decision of The State Council on basic Environmental education Reform and Development," and other documents to promote the curriculum reform of basic environmental education [1]. In 2001, "Basic environmental education curriculum Reform Outline (trial)" (hereinafter referred to as "outline (trial)") was issued, marking the formal implementation of a new round of basic environmental education curriculum reform in China. The purpose of this paper is to analyze the policy environment influencing factors of environmental education development in China and the reform trend in combination with the history of environmental education, as shown in Figure 1.

	Situation	Intentions	Action	Result	Evaluation	Resource
Subject Internationality Country						
Organization						
Area						
Individual						

Value and Beliefs
Organization and System
Resources and Opportunities
Curriculum and Teaching
Evaluation and supervision
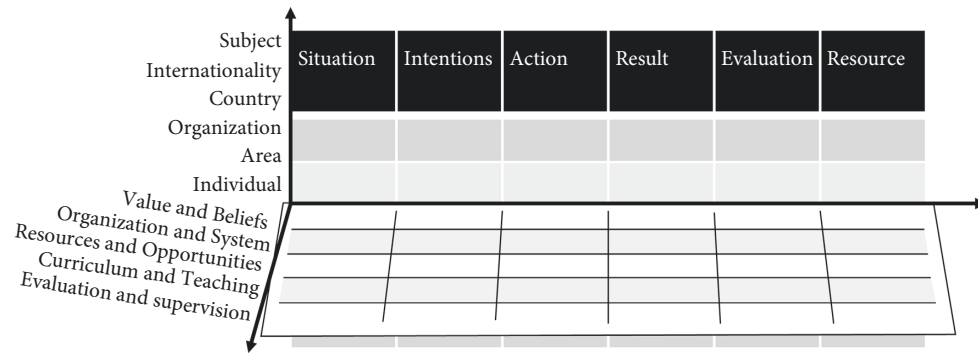
FIGURE 1: Environmental educational reform matrix.

2. State-of-the-art

2.1. Theoretical Significance.
The curriculum has a certain degree of stability, and the teaching is alive and well. With the deepening of basic environmental education curriculum reform and the shift of focus, classroom teaching activities and teaching behavior of teachers and students will become the focus of curriculum and teaching theory and practice research.

This study clearly put forward the "three-standard" curriculum reform concept, clearly put forward to strengthen the teaching behavior research of teachers and students. It is because of the grasp of the future basic environmental education curriculum reform focus shift, so there is a certain theoretical breakthrough and innovation in the study of curriculum theory, and in some aspects, we further expand, enrich, and deepen the field and content of the study of curriculum and teaching theory, as shown in Figure 2.

2.2. Practical Significance.
Based on summarizing the current situation and achievements of the new curriculum reform, this study examines the problems in the new curriculum reform and analyzes their attribution. Based on timely combining prudent reflection and rational evaluation, the corresponding reform strategies of basic environmental education curriculum are put forward. This not only provides corresponding theoretical guidance for the future reform of basic environmental education curriculum in China, but also has important reference value for promoting the future reform of basic environmental education curriculum [2].

Unequivocally, this study proposed "elementary environmental education curriculum reform in our country from class to class to" the study subject, then to the next step to provide a basic environmental education curriculum reform deepening of practice guidance and lead decision makers and practitioners' changing ideas of curriculum reform, that is, the true value of the classroom teaching between teachers and students, so as to play the leading and guiding role of theory to the classroom teaching practice. And we hope to play a role in changing the phenomenon of "although the course is good, the class is still the same." This research can actually guide teachers on how to improve teaching quality in the postepidemic era, how to change their environmentally educational concepts and break through teaching ideas, which has profound practical significance.

3. Methodology

3.1. Review of Existing Studies.
Throughout the relevant research of scholars at home and abroad, it is found that (1) there have been quite fruitful achievements in the subject research of "curriculum" and "classroom" at home and abroad; (2) compared with China, the research on environmental education reform theory in foreign countries is earlier, the related research content is richer, and the research is broader and deeper, especially the study on learning theory; (3) both pay attention to and advocate the application of curriculum or learning theory to classroom teaching practice. In spite of this, there are still some deficiencies in the topic research of this paper, mainly as follows:

First, there are many researches on static curriculum architecture, but few researches on concrete curriculum implementation [3]. At the beginning of the new curriculum reform, that is, since the promulgation of "Outline (Trial)," the majority of researchers and educators have to face the new "concept reconstruction movement," which is the new curriculum idea, curriculum function, curriculum main body, curriculum objective, curriculum content, curriculum implementation, curriculum structure, curriculum evaluation, and so on: on the one hand, how the new concept is accepted by teachers and students, educators; on the other hand, it still remains in the course architecture that should be discussed.

However, there is a lack of theoretical and practical research on why the new curriculum should be implemented and how to implement it in classroom teaching.

Secondly, there are many local, superficial, and scattered researches and relatively few researches on the status of teaching activities of teachers and students in the classroom. For example, as far as the classroom teaching behavior is concerned, most literature focuses on the research of teachers' teaching behavior and students' learning behavior. However, there are relatively few researches on the "cooperation," "interaction," and "relationship" between teachers and students, that is, the "interaction" between teachers and students as both sides of classroom activities [4].
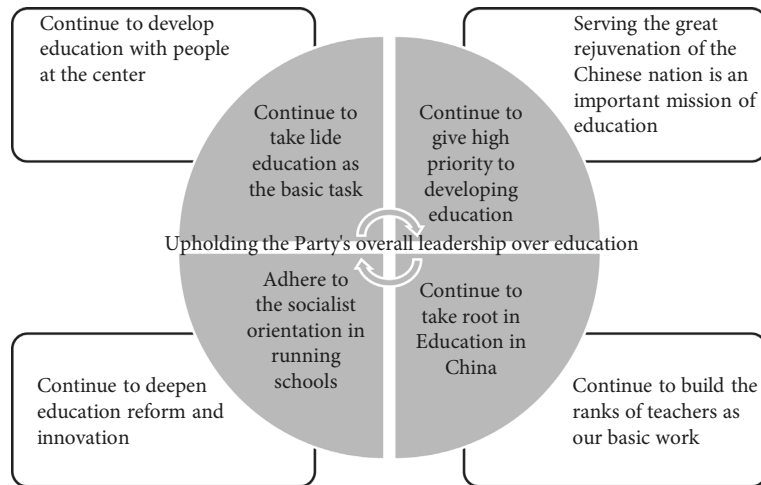
FIGURE 2: The party's overall leadership in environmental education.

Thirdly, there are relatively many researches on the practice of new curriculum reform led by constructivism, postmodernism, and other foreign theories in China, but there is a lack of researches on what theories guide the specific classroom teaching practice. The debate of "what is the theoretical basis of the new curriculum reform?" and "what is the theoretical basis of the new curriculum reform?" has brought a lot of confusion to the practice of the new curriculum reform in China, which also further reflects the absence of the local curriculum and teaching reform theories in the process of the new curriculum reform.

Fourthly, in the aspect of classroom teaching practice, there are many researches using quantitative research methods, but there are relatively few qualitative researches on the classroom teaching behavior of teachers and students. Most environmentally educated researchers use questionnaires and scales to study the achievements, problems, and classroom teaching behaviors of the new curriculum reform, while qualitative research methods such as in-depth interview and observation are seldom applied, and systematic and follow-up research is also lacking [5]. It is necessary to combine quantitative and qualitative methods to grasp all aspects of the new curriculum reform.

Fifthly, there are more studies on explicit policies and measures, but less studies on curriculum reform from the perspective of culture. Although some scholars abroad such as Bruner have seen this from the angle of main body (human) development, the "cognitive" class to generate "cultural class" is the fundamental environmental education reform, and then they published the actuality of environmental education (1971), "meaningful action" (1990), "culture environmental education" (1996), and other works, to guide the reform of environmental education. However, few literatures focus on reform from the perspective of policy, system, and organizational culture, especially the internal culture of teaching practice. In the final analysis, environmental educational reform is a kind of cultural change, and the continuous renewal and development of culture are the fundamental driving forces of the new curriculum reform. We focus too much on the outward form of curriculum reform, but less attention is paid to the "daily" way of existence and the "cultural change" hidden in teaching life, such as the thinking, behavior, and value orientation of teaching subjects, principals, and environmental educational administrators. These problems are closely related to the complexity, variability, and fluidity of the whole new curriculum reform and the reality of basic environmental education in China. The solution to these problems is also complex, dynamic, and full of variables [6]. On the basis of the existing research, the study tries to grasp the achievements and problems of the new curriculum reform as a whole, focusing on the classroom, and taking the transformation of teachers and students' classroom teaching behavior, teachers' professional development, students' independent learning, school culture construction, and other aspects as the breakthrough, hoping to gain something.

3.2. Research on the Present Situation of New Curriculum Reform. The present study of the new curriculum reform includes two parts: one is to sort out the achievements of the new curriculum reform over the past ten years; and the other is to summarize and analyze the problems existing in the new curriculum reform. Through literature retrieval and field sampling investigation, we can grasp the great achievements of curriculum theory exploration, curriculum system construction, and curriculum text construction in the course reform of basic environmental education in the new century in more than ten years. To be specific, there exists a "curricular center tendency" that emphasizes "curriculum" over "classroom," "teaching material" over "teacher," and "subject" over "student." Scheme, planning, and imagination are the root attributes of the static system curriculum. If the curriculum reform wants to bring about more profound changes and achieve the ultimate realization of all kinds of ideas of the curriculum reform, the foothold still depends on teachers to achieve and improve the classroom teaching practice as is shown in the Table 1.

TABLE 1: Mazmanian and Sabatier summarize the factors that influence the effective implementation of policies.

The difficulty of the question	Law control force	Illegal factors
(1) Technical difficulty	(1) Accuracy and importance of objectives	(1) Socio-economic situation and technology
(2) Differences in the behavior of target groups	(2) Compound logic of causality theory	(2) Public support
(3) Target groups as a proportion of the total population	(3) Initial allocation of financial resources	(3) Attitudes and resources of followers
	(4) Degree of integration within or between implementing agencies	(4) The support of the rulers
(4) The extent to which a change in behavior is required	(5) Decision-making rules of the implementing agency	
	(6) Degree of recognition of the decree by policy enforcement officials	(5) Dedication and leadership skills of executive officials
	(7) Official channels of contact for external personnel	

3.3. Research on the Course Reform of Basic Environmental Education from Curriculum to Classroom. Direction research also includes two aspects: one is the direction of "where" research; the first is the study of "who." "Where" research refers to classroom research; the study of "who" refers to the study of subjects and their behavior. The curriculum reform of basic environmental education must move from curriculum to classroom. First of all, the trend from curriculum to classroom is a response to the existing problems and reflection in the curriculum reform of basic environmental education [7]. Secondly, the direction from curriculum to classroom is the objective requirement of classroom teaching is the most basic work in environmental education. Thirdly, the trend from curriculum to classroom is the natural or necessary requirement of improving the quality of basic environmental education by classroom teaching. Fourthly, the trend from curriculum to classroom is the actual need that classroom is more important than curriculum, teachers more important than textbooks, and students more important than subjects in curriculum reform and its implementation. The fundamental trend from curriculum to classroom is to pay attention to the subject of classroom teaching and its behavior, and the key is to realize the change of the subject's behavior. Since the implementation of the new curriculum reform more than ten years ago, the phenomenon of "two skins" still exists in the reform, indicating that the teaching subject in the new curriculum reform has lost its position. The absence of teaching subject in teaching practice directly affects the improvement of classroom teaching quality. Pay attention to the growth of the subject, and let the teaching subject return; change the role of teachers, change the way of learning and communication of students, make teaching subject behavior in place, and realize the course reform from curriculum to classroom. This paper, mainly through thinking about the past, pays attention to curriculum reform and ignores the mistakes of classroom reform, summing up the experience, based on the curriculum reform from curriculum to classroom reform idea to discuss the countermeasures of realize the course reform from curriculum to classroom [8], as shown in Figure 3.

3.4. The Curriculum. Before the new curriculum reform, the existing curriculum structure of our country has serious deficiencies: on the one hand, school curriculum.

Secondary subject courses, subsubject courses, compulsory courses, and national courses dominate, while experience courses, comprehensive courses, elective courses, local courses, and school-based courses do not receive due attention. On the other hand, the imbalance between specific subjects in the school curriculum "has a direct impact on students' physical and mental health and overall development," as shown in Table 2.

Take the nine-year compulsory environmental education Curriculum Plan for Full-time Primary and Junior Middle Schools (Implementation) promulgated by the State Environmental education Commission in 1992 as an example. Elementary school thought moral character, Chinese, math, social, natural, experience, music, art, labor, and other nine division and the junior middle school stage of thought politics, Chinese, mathematics, foreign languages, history, geography, physics, chemistry, biology, sports, music, art, and labor technique sorted all belong to a branch of national unified arrangement courses, compulsory courses, and subject courses, There are few comprehensive courses and elective courses [9].

In order to solve the shortcomings of the above two aspects, the new curriculum reform changes the structure of single curriculum type into a variety of curriculum type structures, so as to change the situation of extreme pursuit of subject score in teaching, low comprehensive quality of students, and poor self-learning ability, so as to promote the all-round development of students. At the same time, in order to highlight students' innovation consciousness, problem analysis, and solution ability and communication and cooperation ability, the new curriculum plan has adjusted the proportion of class hours of each discipline, so that the proportion of courses of each discipline is balanced.

4. Result Analysis and Discussion

4.1. The Influence of Environment on Environmental Educational Reform. Economic base determines superstructure: the environment will affect environmental education reform. In the wake of the COVID-19 outbreak, China has
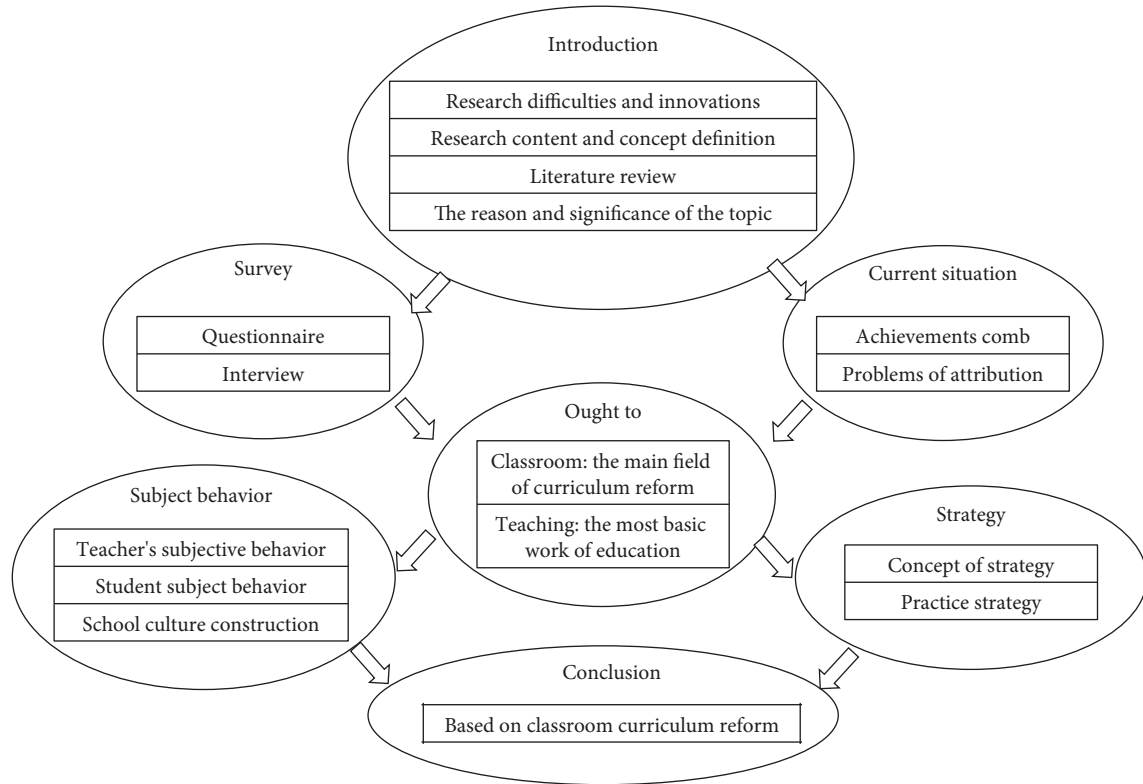
FIGURE 3: Reform of the experimental teaching curriculum.

launched the world's largest "on-campus" environmental education program. In the postepidemic era, China's environmental education reform is facing a new situation based on the changes of influencing factors inside and outside environmental education, that is, the profound reform of environmental education concept, the mixed development of teaching methods, the flexible change of learning methods, the application of data in environmental education governance, and the prominent role of family environmental education [10]. At the same time, environmental education reform is facing new challenges, including the integration of online and offline environmental education, the difference between independent learning and self-management, the coordination between home environmental education and school environmental education, and the fairness of infrastructure and information literacy. To this end, the new countermeasures of environmental education reform are to use big data to serve the improvement of environmental educational governance ability, improve the ability of teachers to integrate online and offline environmental education, promote the development of personalized learning through informatization, promote the improvement of environmental education through accurate environmental educational process evaluation, and promote the efficient collaboration between home and school by using information technology as is shown in Figure 4.

4.2. The New Situation of Environmental Education Reform in the Post-Epidemic Era. The large-scale online environmental education practice during the COVID-19 pandemic has had a great impact on traditional school environmental education. Online environmental education has become a new normal in the development of environmental education, moving from an auxiliary form to a real, comprehensive and mainstream one [11]. The combination of online environmental education and offline environmental education has become an important form of future environmental education, which urgently requires the reform of environmental education system and the construction of a complete structured, systematic, clear, and logical environmental education system starting from environmental education practice and serving environmental education practice, as shown in Figure 5.

4.3. The Profound Reform of Environmental Educational Concept. The current environmental educational concept has changed from collective learning and uniformity to emphasizing individual guidance and individual learning. During the COVID-19 pandemic, "large-scale" online environmental education has become almost the only way of environmental education in China's universities and primary and secondary schools, and the entire environmental education system has taken on a major task, driving a profound change in the concept of environmental education, from class-based environmental education to a new one based on individual environmental education arrangements. In the history of environmental education development, class teaching system is the most far-reaching and still dominant environmental education and teaching method. Teachers conduct orderly environmental education for a

TABLE 2: Curriculum plan of nine-year compulsory environmental education full-time primary school and junior high school.

Course		Learning period grade										
		Primary school						Junior high school			Nine years		
											Week of class		
		One	Two	Three	Four	Five	Six	One	Two	Three	Total hours in primary school	Total class hours in junior high school	Total
Subject	Ideology and morality	1	1	1	1	1	1				204		404
	Ideology and politics							2	2	2		200	
	Chinese language and literature	10	10	9	8	7	7	6	6	5	1734	568	2302
	Mathematics	4	5	5	5	5	5	5	5	5	986	500	1486
	English (I)							4	4			272	272
	English (II)							4	4	4		400	400
	Sociology				2	2	2				204		608
	History							2	3	2		234	
	Geographic								3	2		170	
	Natural science	1	1	1	1	2	2				272		702
	Physics								2	3		164	
	Chemistry									3		96	
	Biology							3	2			170	
	Sports	2	2	3	3	3	3	3	3	3	544	300	844
	Music	3	3	2	2	2	2	1	1	1	476	100	576
	Arts	2	2	2	2	2	2	1	1	1	408	100	508
	Labour			1	1	1	1				136		336
	Labor technology							2	2	2		200	
	Weekly course hours	23	24	24	25	25	25	33	32	27	4964	3074	8038
	Morning meeting (evening meeting)						Ten minutes a day						

certain number of students in specified places. Teaching activities are mainly conducted face-to-face and offline, emphasizing the concept of uniformity and collective learning [12].

Online environmental education mainly carries out environmental education and teaching with the help of environmental education technology such as network, breaks through the limitation of time and space, carries out environmental education and teaching activities, and emphasizes the idea of individual guidance and individual learning. "Internet + Environmental education" breaks through the limitation of the traditional class teaching system on environmental education and teaching at the same time and in the same space. On the one hand, a large number of course resources are put on the shelves, so that students can flexibly choose the content resources they are interested in to meet the needs of personalized development. On the other hand, high-quality curriculum resources provide strong support to weak schools and remote areas, helping promote equity and improve quality.

4.4. Mixed Development of Teaching Methods.
The traditional teaching mode is face-to-face communication between teachers and students, while the online teaching mode is asynchronous interpersonal communication between teachers and students under the condition of time and space separation. Knowledge is no longer limited to teachers but presents the characteristics of informal, social, situational, and distributed network transmission.

Great changes have taken place in the era of teachers as the sole disseminator of knowledge. In the environmental education mainly based on the Internet, teachers need to coordinate all forces to promote the effective development of teaching activities. The hybrid teaching method, that is, the combination of the traditional classroom teaching and the current online learning of students, came into being, combining the advantages of the traditional teaching method with the advantages of the network teaching, breaking through the boundaries of teaching time and space [13]. The gradual development of mixed teaching will inevitably put forward new requirements on the teaching knowledge and ability of teachers, and the traditional role of teachers in lecturing will be transformed into the role of guiding and leading students to learn. Teachers need to update their environmental education concepts, constantly improve environmental education information literacy, guide students to adapt the environmental education reform in the Internet era, make full use of modern information technology, make teaching more rich, diversified, and personalized, and improve teaching efficiency and effectiveness.

4.5. Flexible Changes in Learning Styles.
If environmental education is rigid and mechanical, students will be rigid and mechanical; if environmental education is flexible and adaptable, students will also be influenced by the subtle.

Traditional school environmental education usually makes strict rules and regulations for efficient management
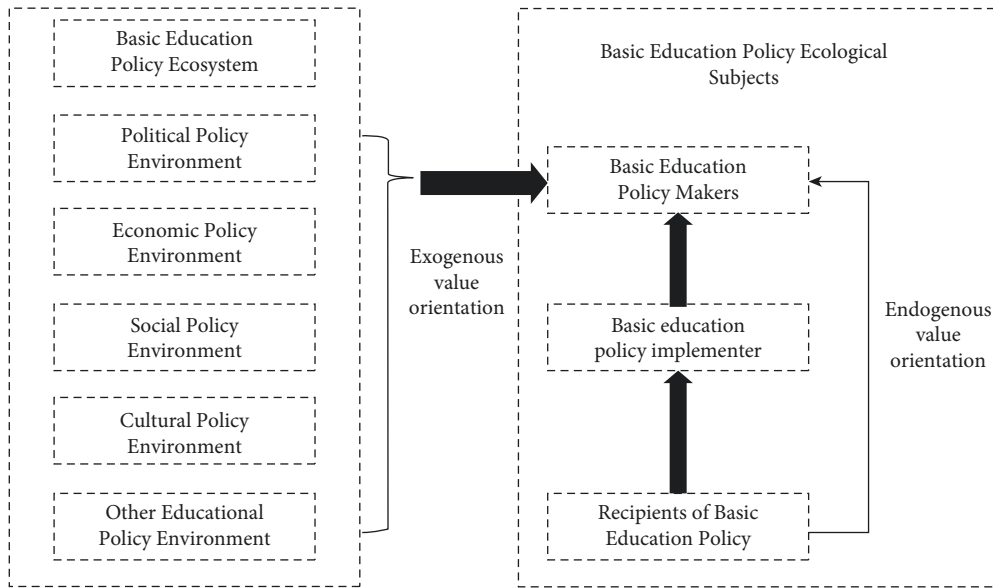
FIGURE 4: Ecological model of multiple impacts of value orientation in basic environmental education policy.
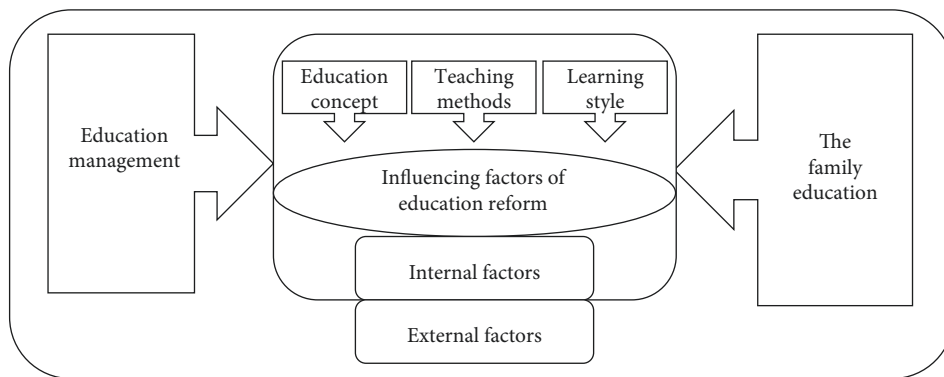
FIGURE 5: Influencing factors of teaching reform.

of students. Although classroom teaching gives full play to the leading and main role of teachers in teaching, it cannot give full play to students' active initiative, and the cultivation of students' innovative spirit and creative ability is still an obvious weak link. To some extent, teacher-led teaching is not conducive to the cultivation of students' creative thinking. Online environmental education prevents copying and applying offline classroom teaching methods, gives full play to the advantages of information technology, and carries out diversified student-centered learning [14].

On the one hand, online courses are not limited by time and place, and students can flexibly choose their study time according to their own time arrangement, which is recognized by students and parents. On the other hand, online environmental education to a large extent meets the needs of students to choose independently, which greatly strengthens students' autonomous learning. Students choose the content and fields they are interested in, which is conducive to realizing personalized development. Network teaching has the excellent characteristics of asynchronous interaction [15]. It can effectively conduct in-depth discussion on a topic through the network, which makes up for the defects of

superficial discussion, perceptual composition, and difficulty in in-depth discussion caused by the limited time in class discussion.

Online environmental education breaks the limitation of offline environmental education time and can increase the discussion links and time. To break the way of face-to-face communication is of great help to students' full communication. Moreover, the collaborative work between groups greatly strengthens the communication between students, promotes cooperative learning, and is conducive to the development of cooperative ability as shown in Figure 6.

That is to say, the current learning style of students has improved, students are thinking and discussing more deeply, and they are communicating with each other more deeply than before. That is to say, students' learning style moves from passive to active.

4.6. Data Use in Environmental Educational Governance. Valet evaluation based on online environmental education carried out, including the students learning time, number, login times of discussion online homework completion, the
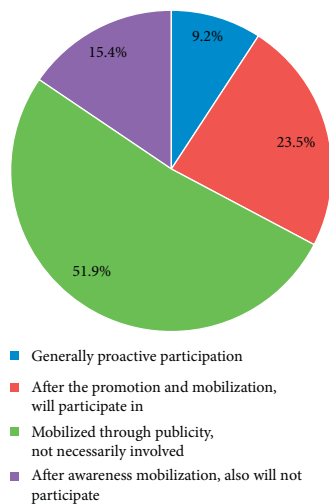
FIGURE 6: The proportion chart of people's different views on the changes in teaching methods.

condition of knowledge mastery, courses such as real-time evaluation, can let the teacher timely grasp the students' learning situation, dynamic adjustment, with the aid of big data, artificial intelligence technology, and personalized assessment to student's study [16].

Teachers can easily create a sequence of learning activities for a certain teaching goal through online environmental education, monitor students' learning activities at any time, judge whether students reach the standard in the learning process, and decide whether to enter the next learning activity; students can quickly enter a sequence of learning activities for efficient individual or group learning.

Through the real-time monitoring and centralized feedback of big data, as well as environmental education management departments, schools, teachers, etc. to grasp the learning situation of students in time, monitor the learning effect of students in time, and improve the way of environmental education, through centralized and timely quantitative processing of big data, subjective impression and judgment of environmental education decision makers can be avoided to a large extent, and data support can be provided for scientific environmental education governance.

That is to say, educators can use the ability of big data mining and analysis to manage students' academic performance, analyze the factors affecting students' academic performance, and analyze current teaching problems from the data level so as to make targeted improvements.

4.7. The Role of Family Environmental Education Is Prominent.
During the COVID-19 pandemic, the impact of home environmental education has become increasingly prominent as online environmental education is carried out at home, with students shifting from "school at home" to "home schooling" and the environmental educational environment shifting from collective learning in schools to individual learning in families. Online teaching methods and family-oriented teaching scenes and teachers' environmental educational power and leading role in previous classroom teaching have been weakened and reduced, and primary and secondary school students have poor independent learning ability, weak self-control ability, unstable cognitive and psychological development, and other comprehensive factors. Parents are required to assume more important responsibilities than before in supervising and guiding students' online teaching, carrying out epidemic prevention and mental health environmental education, and communicating and interacting with teachers in home-school cooperation. Parents are even required to directly participate in home-school coenvironmental education activities to develop students' comprehensive quality and ability at home.

According to the survey, 23.4% of parents said that they always accompany their children to study online, and 29.6% said that they often accompany their children to study online. The top three things that parents help their children study online are urging and reminding their children (74.81%), downloading and uploading homework (50.54%), and logging into the learning platform (47.25%).

There are more uncontrollable factors in the learning environment at home than in school. Schools can relatively effectively control the interference factors in the campus environment and guarantee the quality of classroom teaching. However, homeschooling students face more interference, such as the attraction of entertainment platforms, the temptation of video games, and the influence of family life, which has an obvious negative impact on online environmental education. Parents play an important role in guiding and supervising online environmental education [17].

4.8. Integration of Online Environmental Education and Offline Environmental Education.
Simply holding online teaching and temporarily replacing offline teaching substitution theory can not play the optimization of hybrid teaching.

Some teachers simply take online teaching as a simple substitute for offline teaching and carry out online teaching in traditional teaching methods, ignoring the changes of environmental educational environment and other factors, affecting the effect of online teaching. It is very important for teachers to update their teaching concepts and methods and accept and learn the ideas and technologies of online environmental education. Compared with traditional teaching, blended teaching focuses on cultivating students' innovation ability, and its teaching effect is directly reflected in students' independent learning and scientific research and creation ability. In terms of teaching methods, blended teaching emphasizes the multiple interactions between teachers and students as well as between students, and its teaching effect is directly reflected in the students' cooperation and communication ability. In terms of teaching quality, the reasonable selection and effective use of resources in hybrid teaching adapt to the needs of the development of the information society, which not only helps students expand their knowledge and expand their thinking space, but also helps students improve their ability of scientific exploration.

The effectiveness of blended teaching depends to a large extent on the teacher's attitude and ability preparation and on how the teacher makes the transition from the traditional role of face-to-face classroom to the more complex role required by blended teaching.

Some teachers are ill-prepared for online environmental education during the COVID-19 pandemic, and there have been numerous online complaints about teachers becoming anchors, teachers being unfamiliar with environmental educational software, and teachers being slow to respond. To a large extent, this reflects that the society is still unfamiliar with online environmental education, teachers' environmental educational information technology literacy needs to be improved, and students' online learning preparation is insufficient [18]. According to the survey, 7.73 percent of primary and secondary school teachers believe that online environmental education does not need to prepare lessons in advance. The top three online teaching methods of teachers are watching national or regional platform courses and teachers' centralized Q&A (56.04%), broadcasting famous teachers' courses and teachers' guidance Q&A (48.46%), and teachers' live courses (29.25%). New situation, New challenges, and New Countermeasures of China's environmental education reform in the postepidemic era 02166.8% of teachers chose "insufficient interaction." Direct use of existing teaching resources is the main channel for online teaching methods during the COVID-19 pandemic. Online environmental education has a great impact on some subject environmental education. Online teaching of PE makes interactive information of PE teaching missing, obstacles to the creation of PE teaching situation, vacancy of PE teaching methods, and blind spots in the evaluation of PE teaching effect. Online environmental education has a negative impact on physics, chemistry, and other experimental courses that require strong operational ability. Although it has a certain promoting effect on theoretical knowledge learning, it is not conducive to the cultivation of students' practical operational ability.

Therefore, in the future teaching, the interaction between online teachers and students can be strengthened from the technical level, such as the development of VR technology and the application of 3D video technology in teaching. From the perspective of human resources, teacher training should be strengthened to improve the quality of online teaching, and the combination of online and offline teaching can be adopted.

4.9. The Difference between Autonomous Learning and Self-Management. With the in-depth development of "Internet + environmental education" and the in-depth promotion of online environmental education, students have more and more content and channels to learn independently. In the implementation process of online environmental education, the supervision and monitoring of environmental education itself are difficult. The independent role of students in "learning" is prominent, while the leading role of teachers in "teaching" is not enough. When students have great freedom in learning and lack necessary supervision and monitoring,

it is more difficult to effectively achieve environmental educational goals [19]. In the postepidemic era, with the full restoration of normal environmental education and teaching order, it is particularly urgent to cultivate students' initiative and enthusiasm in learning and give full play to the advantages of hybrid teaching. Students' consciousness and self-discipline are important factors affecting the development and further promotion of online environmental education. Only the learners with independent and self-controlled ability can successfully complete the learning tasks in distance environmental education, and the cultivation of independent learning ability is an urgent problem to be solved.

Online environmental education is restricted by learning environment and students' independent learning ability. Teachers cannot effectively manage and supervise students' learning process, and its effect mainly depends on students' independent learning. Primary and secondary school students aged 6–18 years old, with their self-control ability being relatively weak and easy to be interfered by external factors, appear to be absent from online class. Problems such as playing games and shifting attention have a negative impact on the effect of online environmental education. The effectiveness of online environmental education largely depends on the self-control ability of students in learning, while the self-control ability of students in different regions, schools, and groups varies greatly, leading to great differences in learning effects.

Therefore, schools should find ways to improve students' learning self-control ability through teaching, so as to solve this problem.

4.10. Synergy between Family Environmental Education and School Environmental Education. During the COVID-19 pandemic, schools and families entered a state of collaborative environmental education, and home-school cooperation was short.

Problems gradually emerged, mainly manifested as lack of awareness and mechanism of home-school cooperation, prominent "new engineering contradiction" between parents' work and tutoring for children's learning, and inadequate matching between supervision and guidance for children's online learning at home and parents' knowledge and ability. Online environmental education at home leads to changes in school places and more opportunities for parents to be alone with their children. Parents should not only guide their children's study, but also maintain a good parent-child relationship, so the knowledge and ability of family environmental education are particularly important. However, most of the parents in China lack of preparation for family environmental education, how to carry out family environmental education, how to maintain the relationship between school and students as an important link, how to guide children's study, and growth and other issues are quite different, resulting in a huge difference in environmental educational effects.

Although problems such as out-of-school training have been eased during COVID-19, they have shifted to online

training, and it is still common for parents to "value intellectual environmental education over other environmental education." With the implementation of the policy of "suspension without suspension," the phenomenon of some parents signing up for online training courses for their children is gradually increasing. Offline after-school training is transformed into online after-school training, which increases the academic burden of children and affects their all-round development [20]. In addition, online environmental education is mainly intellectual environmental education, while moral environmental education, physical environmental education, aesthetic environmental education, and labor environmental education encounter difficulties, and the problem of one-sided development of students becomes more and more prominent. Parents shoulder the role of educators and the responsibility of guiding children's all-round development. To help children "button their first button in life," it is necessary to update the concept of family environmental education and improve their environmental educational ability.

Schools should actively contact and cooperate with parents and improve the coordination between family environmental education and school environmental education through parents' meeting and parents' communication of teaching philosophy.

5. Conclusion

This paper mainly studies the course reform of elementary environmental education in the new century from curriculum to classroom from the perspective of curriculum and teaching theory. This paper thinks that the current reform trend is the integration of online environmental education and wired environmental education, the change of teaching concept. To continue the research on this topic, the following aspects are worth pondering: (1) classroom is the center of the curriculum reform of basic environmental education, and the importance of classroom can be studied from the perspectives of sociology, ecology, management, ethics, and so on. (2) Fully explore the teaching theories guiding the future reform of basic environmental education curriculum from curriculum to classroom, especially the local excellent, traditional, or contemporary curriculum and teaching theories. After all, basic environmental education curriculum reform needs advanced, scientific, and appropriate theoretical guidance, rather than just practical operation. (3) The fundamental path of teacher professional development of the problem: teacher professional development is not only external training and training, but also teachers' self-conscious learning and independent professional development in teaching life. From the perspective of lifelong learning, teachers mainly achieve independent professional development through "internal force." Therefore, "we must give the responsibility of professional development to teachers themselves" and let teachers carry out self-led professional development.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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Research Article

The Construction Strategy of a New Model of College Students' Psychological Education under the Network Environment

Bin Cai (ID)

School of Computer Science, Minnan Normal University, Zhangzhou, China

Correspondence should be addressed to Bin Cai; caibin@mnnu.edu.cn

Understanding the interests and needs of online health education for college students, exploring the concepts, procedures, models, and approaches of health plans, learning about mental health online, and developing a comprehensive online mental health education plan for as many college students as possible are always very popular. Based on the development and support of online mental health education for students, from the perspectives of teachers and college students, this paper investigates online mental health education for college students in a city, combined with data interviews and Delphi routes; through electronic questionnaires, 900 college students and 30 students were selected by faculty members to conduct an investigation. With descriptive statistics, reliability and availability, chi-square tests, and other options, this paper examines data on student Internet usage and current status and we have the Psychiatry Network. The results show that 91.75% of college students study online every day and 61.72% spend more than 4 hours online every day. Satisfaction with the Internet has a certain impact on the online application and use of the health college education. Students' online motivations and behaviors are multicultural. In order to build a mental health education network, educators believe that the primary goal should be to improve the mental health of college students.

1. Introduction

Mental health is the foundation of cognition. Only by having a healthy university environment can students' morality, intelligence, physique, and beauty be improved in all aspects. College students are the backbone of the nation's future, leading to high expectations from individuals and parents [1]. Mental health not only affects the normal education, life, and happiness of college students but also affects the overall quality of Chinese art. It is a major event related to the rise and fall of the country and the survival of the nation. With the advent of the era of knowledge economy and information society, people's pace of life has accelerated significantly, social competition is becoming increasingly fierce, social members are under increasing pressure, and the number of patients with mental diseases is increasing day by day. As a special group with high expectations from society and parents, college students also face greater pressure than other peer groups. The school stage is a period of rapid development in physiology and psychology. It is a

transitional period in which individual psychology rapidly moves towards maturity but not yet fully matures [2, 3]. In recent years, the rapid development of computer and network technology has brought many new features to the mental health of college students. College students can share the best resources on the network through the Internet, obtain information more easily, and communicate more easily. However, while the Internet is convenient for students to study and live, it also has many disadvantages for students' health. Many college students do not know how to restrain and control themselves when surfing the Internet. They are addicted to the illusory world of the Internet and cannot free themselves. They suffer from various Internet psychological obstacles such as Internet dependence, Internet loneliness, and Internet addiction syndrome. With the impact and subversion of the Internet tide, the form, content, and integration of student health education have undergone major changes. The psychiatric education standards have difficulty adapting to the major problems brought by the Internet to the psychiatric education in colleges and

universities [4]. Therefore, for health educators in colleges and universities, it has become a rapid research topic to strengthen the research of mental disciplines in the network environment and how to better educate students to carry out mental health education in the network environment [5].

2. Literature Review

Taghvaei et al. found that as the Internet slowly entered all aspects of public life, it not only had a positive impact on the country and people but also had a negative impact on human psychology [6]. Zhang et al. studied human behavior, mental health, education, and social relations in the network environment, which has become an important part of the research [7]. Zhao et al. believed that mental health research in the network environment not only is a new study of mental health but also plays an important role in supporting the further development of mental illness [8]. Allen et al. found that Western countries, led by the United Kingdom and the United States, were the first to become popular on the Internet. After studying the relationship between the emergence of the Internet environment and human psychological changes, scientists found that the Internet environment can make the elderly change their minds [9]. In the 1970s and 1980s, the "problem-solving-centered" training mode appeared in Britain. Its training work is mainly composed of three parts: preparation before professional training, professional training and on-site work, and advanced professional training. The British Psychological Society stipulates the minimum qualifications for workers: graduate degree or above, teacher qualification certificate, more than two years of teaching experience with children and adolescents, at least two years of educational psychology training after graduate degree, etc. Alégroth and others found that, since the 1980s, France has also set up special training programs, including two parts of trainees' professional learning and internship [10]. Qualification requirements for workers in France were two years of psychology major in university, at least three years of teacher training, and five years of primary school or preschool work experience. The training of school mental health educators in the United States is mainly based on the "scientist practitioner" model, combining research and practice. Applicants should enter the school psychology major taught by the American Association of school psychologists and the American Psychological Society. Marcial and Launer and others found that 20% of people will have "Internet addiction" in the network environment through statistics and analysis of the questionnaire results. They need to surf the Internet every day, and it is difficult to get away from the network environment. In comparison, only 12% of people think that the Internet will bring them a sense of ease and pleasure [11]. Pereira et al. separate the concept of cyber health from that of mental network and study it as a separate concept. However, their concept of cyber health still starts from the concept of mental health and does not understand the importance of the cyber environment [12]. Yasui et al. found that other researchers in cyber psychiatry studies did not account for the merits of disrupting cyber environmental processes [13].

To understand the network and mental health of high school students in a city, this study explores the prevention and improvement of high school students' mental health and college time network and provides a foundation for supporting the development of higher education students' mental illness. According to the development and use of online health services for male and female college students in a city, Yusuwan, New Mexico, found the key points that can improve the mental health of current college students in online learning and gave tips and suggestions to improve the effectiveness of online education for college students' mental health [14]. Based on interest and demand for online health education, more research is required to develop prevention and develop and clean online content and programs for preventive health education, as shown in Figure 1.

3. Research Methods

According to the principles of random sampling and convenient sampling, a total of 900 college students were randomly selected from full-time universities, independent colleges, vocational and technical colleges, and colleges in a city. According to the five inclusion criteria of psychology professional background, master's degree or above, full-time mental health education, intermediate professional title or above, and more than 3 years of experience, 30 college mental health educators in a city were randomly selected as the survey objects.

Firstly, we made a statistical description of the distribution and recovery of the questionnaire, the sociodemographic characteristics of the sample, and the use of Internet by college students. Then, EpiData was used to establish the database, Spss17.0 software was used to evaluate the reliability and validity of the questionnaire, and chi square test, analysis of variance, correlation analysis, and multiple stepwise regression analysis were performed on the survey data.

Nine mental health professionals were specially invited to complete interviews with experts on the selection criteria of the questionnaire for "Research on the Construction of College Students' Health Network." In the first round of preresearch, experts put forward suggestions on adding, modifying, or deleting the questionnaire items based on the preliminary data analysis and research results, as well as the preliminary design of the questionnaire and the author prepared options; in the second part of the interview, the experts removed items with an average score of less than 3 and a difference of more than 40% and continued to apply the average Score 3~ of expert opinion. The coefficient of variation is 20% to 40%; in the third part of the expert interview, the importance and effectiveness of the measures will be reevaluated, and the weight of the indicators will be consulted. We sorted out the expert consultation questionnaire data, calculated the expert enthusiasm coefficient, expert authority degree coefficient, expert opinion coordination coefficient, and expert opinion variation coefficient using spss170, selected appropriate indicators, and tested the reliability and authority of the consultation results [15].
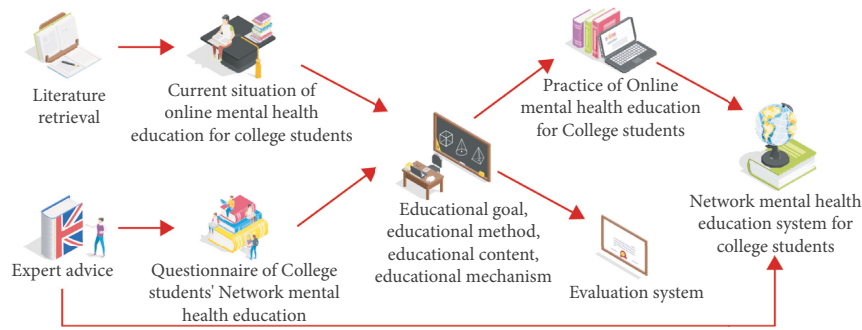
FIGURE 1: Technical roadmap.

3.1. Selection of Consulting Experts. According to the selection criteria of experts with psychology- and pedagogy-related background and intermediate professional title or above, who engaged in college students' mental health education and research for more than 5 years, a total of 9 experts were invited in this study, most of whom are the (deputy) director of the mental health education and psychological counseling center of a provincial university, and all of them have rich theoretical basis and practical accumulation of college students' mental health education. Among them, four experts have doctoral degrees, four experts have master's degrees, and one expert has bachelor's degrees. The professional background covers psychology, management, pedagogy, medicine, and other disciplines. At the same time, the age range of experts is 36~66 years, and the average age is 48 years. There are 6 experts who have worked for more than 10 years, of which 3 have worked for more than 20 years. In addition, 2 experts have positive and senior professional titles and 5 experts have deputy senior professional titles. In conclusion, the consulting experts have a high degree of professional authority and familiarity with the contents of this study (see Table 1 for details).

3.2. Expert Positive Coefficient. This study takes the recovery rate of consultation questionnaire as the index. The higher the recovery rate of questionnaire, the higher the positive coefficient of experts. In the first presurvey round, 2 paper versions and 7 electronic versions of expert consultation questionnaires were distributed. Experts were invited to score the importance and feasibility of the initial items at five levels, experts' opinions were collected on the index system of the initial questionnaire, and experts' questions were answered in time. After one week, a total of 9 effective expert consultation questionnaires were recovered, and the positive coefficient of experts reached 100%.

The second and third rounds of formal expert consultation sent 9 electronic questionnaires respectively. Each consultation questionnaire includes filling in instructions, importance and feasibility scores, index weights, and judgment basis. The two rounds of formal consultation are one week apart. In the second round of formal consultation, there were two expert questionnaires with individual missing options. The corresponding experts were contacted in time for supplement. Finally, nine

TABLE 1: Basic information of consulting experts.

Basic information		Number of people	Proportion (%)
Gender	Male	2	22.22
	Female	7	77.78
Age	30–39 years old	3	33.33
	40–49 years old	1	11.11
	50–59 years old	4	44.44
	Over 60 years old	2	22.22
Major	Psychology	6	66.67
	Management	1	11.11
	Education	1	11.11
	Medical science	1	11.11
Education	Undergraduate	1	11.11
	Master's degree	4	44.44
	Doctoral candidate	4	44.44
Occupation	Teacher	8	88.89
	Psychological consultation teacher	1	11.11
Title	Intermediate	2	22.22
	Deputy senior	5	55.56
	Positive advanced	2	22.22
Years of service	5–10 years	3	33.33
	11–15 years	2	22.22
	16–20 years	1	11.11
	More than 20 years	3	33.33

effective consultation questionnaires were recovered in the two rounds of formal consultation, and the expert positive coefficient was 100% [16].

3.3. Expert Authority Coefficient. The judgment basis (Ca) and familiarity (Cs) are the two determinants of the expert authority coefficient (Cr), and the calculation formula is as follows [17]:

$$Cr = \frac{(Ca + Cs)}{2}. \tag{1}$$

This study selects four judgment bases, practical experience, theoretical basis, peer understanding, and intuitive judgment and gives three-level quantitative values. At the same time, experts' familiarity is divided into five levels: "very familiar," "relatively familiar," "general," "relatively unfamiliar," and "unfamiliar," and different quantitative values are given (see Table 2 for details) [18].

TABLE 2: Quantitative value of expert authority coefficient.

Familiarity	Quantization coefficient (Cs)	Judgment basis	Quantization coefficient (Ca)		
			Large	Middle	Small
Very familiar	1.0	Theoretical basis	0.3	0.2	0.1
Quite familiar	0.8	Practical basis	0.5	0.4	0.3
Commonly	0.6	Peer understanding	0.1	0.1	0.05
Less familiar	0.4	Intuitive judgment	0.1	0.1	0.05
Unfamiliar	0.2				

According to the experts' scores on the educators' questionnaire, the first-level index expert authority coefficient is between 0.763 and 0.885, with an average of 0.810. The coefficient of expert authority degree of secondary index ranges from 0.712 to 0.806, with an average of 0.762. According to the scores of experts on the questionnaire of college students, the authority degree coefficient of the first-class index experts is between 0.786 and 0.822, with an average of 0.803. The coefficient of expert authority degree of secondary index ranges from 0.719 to 0.822, with an average of 0.765. In this study, the degree coefficient of expert authority is greater than 0.70, and the average degree coefficient of expert authority at all levels reaches or approaches 0.80, indicating that the degree of authority of experts on the research content is very high.

3.4. Coordination Coefficient of Expert Opinions.

In this study, Kendall harmony coefficient is selected to judge the consistency of expert opinions. The closer the Kendall harmony coefficient is to 1, the higher the consistency of expert opinions is. Kendall harmony coefficient is in the range of 0.4~0.5, indicating that the prediction result is desirable, higher than 0.7, which can be considered as a very high degree of expert consistency. In the second round of formal consultation, the Kendall harmony coefficients of the overall index importance and feasibility of the educators' questionnaire were 0.432 and 0.417, respectively, and the Kendall harmony coefficients of the overall index importance and feasibility of the college students' questionnaire were 0.584 and 0.517, respectively, reaching a basically consistent level. In the third round of formal consultation, the Kendall harmony coefficient of the two types of questionnaire indicators increased significantly, which shows that the expert opinions tend to be consistent. The Kendall harmony coefficient of the overall index importance and feasibility of the questionnaire reached 0.7, and the p value was less than 0.05, indicating that the expert evaluation results are desirable (see Tables 3 to 4 for details).

3.4.1. Index System Screening Results.

In the first preliminary evaluation, the experts asked to add an important "teaching goal" indicator to the teacher questionnaire, and eight secondary "teaching goals" indicators: "The Benefits of Learning Mental Health Network," "The Concept of Learning Mental Health Network," "Training Objectives of Mental Health Education Network," "Online Self-Help and Collaboration," "Online Self-Help Concept," and Communication and Cooperation." At the same time, eight secondary indicators of "online time period," "online emotional motivation," "online emotional experience," "online browsing content," "satisfaction with online mental health education," "online self-help and mutual assistance," "online self-help and mutual assistance content," and "impact of nonmainstream culture" were added to the college students' questionnaire. In addition, the "network mental health education content" is divided into three secondary indicators: "network mental health education curriculum content," "online measurement and evaluation content," and "online psychological counseling content," and the experts have modified its option setting.

In the second round of formal consultation, the secondary indicator of "impact of nonmainstream culture" was deleted according to the deletion standard. After three rounds of expert consultation, the educators' questionnaire selected six first-class indicators of "feasibility," "management system," "support system," "education objective system," "education system," and "education effect evaluation," and the following 30 second-class indicators. The questionnaire of college students selected four first-class indicators of "network use," "use intention and demand," "use status and effect," and "construction of education system," and the following 32 second-class indicators.

3.4.2. Index Weight.

The weight scores of the indicators given by experts were normalized. The calculation shows that the weights of the six primary indicators in the educator questionnaire are close to each other. Among them, "feasibility," "support system," and "education system" have the highest weight of 0.1800 and "management system" has the lowest weight of 0.1400. Among the secondary indicators, the top three items with the highest weight are "training objectives of online mental health education," "effectiveness of online mental health education," and "values of online mental health education," and those with the lowest weight are "online self-help and mutual assistance content," "online measurement and evaluation content," and "online psychological counseling content." In the teacher questionnaire, the weights of the two concepts of "Internet use" and "rules and regulations" are 0.2625, and the weights of the concepts of "Internet use," "use goals and needs," and "educational development" are 0.2375. On the second scale, the top five most important criteria were "terms used in online mental

TABLE 3: Coordination coefficient of expert opinions (questionnaire for educators).

Index	Scoring item	N	The second round of formal consultation			The third round of formal consultation		
			W	X^2	p	W	X^2	p
Primary index	Necessity	6	0.601	27.091	0.000	0.653	19.591	0.000
	Feasibility	6	0.488	22.006	0.000	0.626	18.780	0.000
Secondary index	Necessity	30	0.418	112.860	0.000	0.844	151.742	0.006
	Feasibility	30	0.383	103.410	0.000	0.836	150.300	0.021
Tertiary indicators	Necessity	36	0.433	139.967	0.000	0.720	155.304	0.000
	Feasibility	36	0.418	135.108	0.000	0.707	152.713	0.000

TABLE 4: Coordination coefficient of expert opinions (questionnaire for college students).

Index	Scoring item	N	The second round of formal consultation			The third round of formal consultation		
			W	X^2	P	W	X^2	P
Primary index	Necessity	4	0.787	21.249	0.001	0.853	23.031	0.000
	Feasibility	4	0.699	18.845	0.000	0.753	20.304	0.006
Secondary index	Necessity	33	0.440	130.978	0.000	0.615	176.832	0.000
	Feasibility	33	0.387	114.939	0.000	0.603	173.375	0.000
Tertiary indicators	Necessity	37	0.585	194.472	0.001	0.738	239.436	0.000
	Feasibility	37	0.517	172.160	0.000	0.705	228.421	0.000

health education," "significantly affecting the use of online mental health education," " the importance of online mental health education," "need for online mental health education," and "interest in doing online mental health education." The most important are "online self-help and content sharing services," "online mental health counseling content," and "online content measurement" (see Tables 5 and 6 for details).

Based on literature research and case interviews, combined with the data obtained from expert consultation, and according to the selection principles of suitability, systematicness, feasibility, and effectiveness indicators, a questionnaire on mental health education for college students in a city (educators/college students) is compiled. In the questionnaire for educators, the five-grade scoring system is adopted for the four secondary indicators of importance, need, and willingness to carry out and effect perception, and the multichoice method is adopted for the four secondary indicators of appropriate contents of online courses, online measurement and evaluation, online psychological counseling, and online self-help and mutual assistance. The questionnaire for college students includes three parts: demographic characteristics, Internet use, and Internet mental health education. Among them, the five-level scoring system is adopted for the seven secondary indicators of importance, need, understanding, willingness to use, frequency of use, satisfaction, and effect perception, and the multichoice method is adopted for the four secondary indicators of online courses, online measurement and evaluation, online psychological counseling, and online self-help and mutual assistance. At the same time, an open question was set at the end of the two types of questionnaires to collect the suggestions of educators and college students on online mental health education.

4. Result Analysis

Nine experts were invited to distribute the electronic questionnaire through the questionnaire star in multiple colleges. The quality of questionnaire filling is controlled by means of question type design, option setting, IP control, filling logic, screening rules, and so on. A total of 932 questionnaires were collected from college students in this study, and 23 questionnaires with a duration of less than 180 seconds were excluded. A total of 909 valid questionnaires were compiled, with an effective rate of 97.53%; at the same time, a total of 34 teachers were asked questions, excluding 0 questionnaires with a duration of less than 120 seconds, a total of 34 active questionnaires, with 100% quality assurance.

Among the surveyed college students, 561 (61.72%) were women and 348 (38.28%) were men. Their majors covered liberal arts, science, engineering, agriculture, economics, management, medicine, art, and other disciplines. The grades were widely distributed, mainly freshmen (37.29%) and sophomores (30.03%). The proportion of non-only-children (75.91%) was high, and the proportions of urban and rural students were basically the same (see Tables 7–11 for details).

Cronbach's Alpha coefficient is an internal belief commonly used to measure the consistency of a questionnaire. It is generally believed that if the coefficient is greater than 0.7, the reliability of the questionnaire is high, and if the coefficient is greater than 0.8, the reliability of the questionnaire is very good [19].

4.1. Reliability Test of Educators' Questionnaire. SPSS 170 analysis results show that [11,20] total Cronbach's Alpha coefficient of teacher query is greater than 0.8, and

TABLE 5: Index weight (educator questionnaire).

Primary index	Weight coefficient	Secondary index	Weight coefficient
Feasibility index	0.18	The importance of learning about mental networks	0.0413
		The degree of need for psychiatric network education	0.0413
		Interest in online mental health education	0.0308
		Factors of attracting network mental health education	0.0324
		Factors affecting the development of network mental health education	0.0342
Management system indicators	0.14	System construction	0.0518
		Organizational leadership	0.0490
		Supervision	0.0392
Support system indicators	0.18	Teaching staff	0.0450
		Supervision system	0.0396
		Financial support	0.0414
		Working conditions	0.0288
		Network presentation level	0.0252
Education objective system indicators	0.16	Values of network mental health education	0.0544
		Concept of network mental health education	0.0480
		Training objectives of network mental health education	0.0576
Education system indicators	0.18	Suitable channels for network mental health education	0.0166
		Activity-appropriate online mental health education	0.0176
		Essential information for the mental health education network	0.0176
		Network mental health education course	0.0176
		Suitable content of network mental health education course	0.0155
		Online measurement and evaluation	0.0151
		Suitable content for online measurement and evaluation	0.0112
		Online psychological counseling	0.0166
		Suitable content of online psychological counseling	0.0119
		Online self-help and mutual assistance	0.0130
		Suitable content for online self-help and mutual assistance	0.0097
Evaluation index of educational effect	0.16	Effectiveness of network mental health education	0.0557
		Factors affecting the effect of network mental health education	0.0522
		Evaluation method of network mental health education effect	0.0522
Feasibility index	0.18	Importance of network mental health education	0.0413
		The degree of need for network mental health education	0.0413
		Willingness to carry out online mental health education	0.0308
		Factors of attracting network mental health education	0.0324
		Factors affecting the development of network mental health education	0.0342
Management system indicators	0.14	System construction	0.0518
		Organizational leadership	0.0490
		Supervision	0.0392
Support system indicators	0.18	Teaching staff	0.0450
		Supervision system	0.0396
		Financial support	0.0414
		Working conditions	0.0288
		Network presentation level	0.0252
Education objective system indicators	0.16	Values of network mental health education	0.0544
		Concept of network mental health education	0.0480
		Training objectives of network mental health education	0.0576
Education system indicators	0.18	Suitable channels for network mental health education	0.0166
		Network mental health education is suitable for carrying out activities	0.0176
		Suitable forms of network mental health education	0.0176
		Network mental health education course	0.0176
		Suitable content of network mental health education course	0.0155
		Online measurement and evaluation	0.0151
		Suitable content for online measurement and evaluation	0.0112

TABLE 5: Continued.

Primary index	Weight coefficient	Secondary index	Weight coefficient
		Online psychological counseling	0.0166
		Suitable content of online psychological counseling	0.0119
		Online self-help and mutual assistance	0.0130
		Suitable content for online self-help and mutual assistance	0.0097
Evaluation index of educational effect	0.16	The effectiveness of psychological network education	0.0557
		The importance of learning the benefits of the mental health network	0.0522
		Psychoeducational network evaluation	0.0522

Cronbach's Alpha coefficient of query length is 0.7, indicating that the questionnaire is based on research (see Figure 2 for details) [21].

4.2. Reliability Test of College Student Questionnaire.
Overall Cronbach's Alpha coefficient of the college students' questionnaire was 0.845, and Cronbach's Alpha coefficients of the four major questionnaires were all greater than 0.7. As can be seen, the questionnaire is research-based (see Figure 3 for details) [22].

Validity reflects the consistency between the test results and the tester's real behavior. The higher the validity is, the more accurate and effective the test can be. This research questionnaire is formulated through expert consultation, and experts mainly evaluate it with professional knowledge. It can be considered to have good valid content. Meanwhile, state analysis was used to evaluate the feasibility of the questionnaire. First, by KMO and Bartlett's test of sphericity, when the KMO data is greater than 0.7, it indicates that the questionnaire is suitable for analysis [23].

The KMO test measures different data in terms of correlation coefficients and semicorrelation coefficients. When the sum of squares of the simple correlation coefficients of all variables is equal to the number of squares of the fractional correlation coefficients, the stronger the correlation of variables is, the more suitable it is for principal component analysis. Otherwise, it is not suitable for critical analysis.

Let $(X_i, Y_i)(i = 1, 2, \ldots, n)$ be the sample taken from the population; the calculation formula of Pearson simple linear correlation coefficient of the sample is as follows [24]:

$$\rho = \frac{\sum_{i=1}^{n}(X_i - \overline{X})(Y_i - \overline{Y})}{\sqrt{\sum_{i=1}^{n}(X_i - \overline{X})^2}\sqrt{\sum_{i=1}^{n}(Y_i - \overline{Y})^2}}, \tag{2}$$

$$\overline{X} = \frac{1}{n}\sum_{i=1}^{n}X_i, \tag{3}$$

$$\overline{Y} = \frac{1}{n}\sum_{i=1}^{n}Y_i. \tag{4}$$

The partial correlation coefficient is calculated by the correlation coefficient of two variables in fixing the strength of the other variable, and it can affect the degree of linear correlation of one of the two variables under the influence of the other fixed differently. The formula for the partial correlation coefficient is as follows:

$$r_{xy,z_1} = \frac{r_{xy} - r_{xz_1}r_{yz_1}}{\sqrt{\left(1 - r_{xz_1}^2\right)\left(1 - r_{yz_1}^2\right)}}, \tag{5}$$

$$\frac{r_{xy} - r_{xz_1}r_{yz_1}}{\sqrt{\left(1 - r_{xz_1}^2\right)\left(1 - r_{yz_1}^2\right)}} = h = 1, \tag{6}$$

$$r_{xy,z_1z_2z_3\ldots z_h} = \frac{r_{xy,z_1z_2z_3\ldots z_{h-1}} - r_{xz_h,z_1z_2z_3\ldots z_{h-1}}r_{yz_h,z_1z_2z_3\ldots z_{h-1}}}{\sqrt{\left(1 - r_{xz_h,z_1z_2z_3\ldots z_{h-1}}^2\right)\left(1 - r_{yz_h,z_1z_2z_3\ldots z_{h-1}}^2\right)}}, \tag{7}$$

$$r_{xy,z_1z_2z_3\ldots z_h} = h \geq 2, \tag{8}$$

where $r_{(xy,z_1)}$ is the number of stable exchanges; $r_{(xy,z_1z_2z_3\ldots z_h)}$ is the fixed exchange; and $r_{(xy,z_1z_2z_3\ldots z_h)}$ is the simple correlation coefficient of the variable.

Assuming that the squared equation of the average correlation coefficient is P and the squared equation of the average correlation coefficient is r, the standard calculation of the KMO test statistic is

$$M = \frac{P}{P + R}. \tag{9}$$

The Bartlett sphericity test starts with the relative coefficient matrix of the original matrix, and its null hypothesis is that the relative coefficient matrix is the identity matrix. The statistics for Bartlett's test of sphericity are determined based on the coefficient matrix. The standard calculation of statistics is as follows [25]:

$$\varnothing = \det(O), \tag{10}$$

$$\varnothing = \lfloor O \rfloor. \tag{11}$$

According to the observed values of degrees of freedom and statistics, the corresponding concomitant probability

Table 6: Index weight (college student questionnaire).

Primary index	Weight coefficient	Secondary index	Weight coefficient
Network usage indicators	0.2625	Internet access equipment	0.0230
		Internet frequency	0.0315
		Average online time per day	0.0381
		Internet habit time period	0.0282
		Main purpose of surfing the Internet	0.0308
		Online emotional motivation	0.0249
		Online emotional experience	0.0249
		Engaging in activities online	0.0289
		Browsing content online	0.0322
Use intention and demand indicators	0.2375	The importance of learning about mental networks	0.0455
		The degree of need for network mental health education	0.0475
		Willingness to carry out online mental health education	0.0475
		The main attraction of studying mental networks	0.0505
		Important factors affecting the development of mental health education network	0.0475
Application status and effect indicators	0.2625	Understanding network mental health education	0.0348
		Frequent use of online mental health education	0.0420
		Most people use online mental health information	0.0354
		The effectiveness of psychological network education	0.0348
		Satisfaction degree of network mental health education	0.0420
		Factors affecting the effect of network health education	0.0354
		Psychoeducational network evaluation	0.0381
Educational system construction indicators	0.2375	Suitable channels for network mental health education	0.0214
		Network mental health education is suitable for carrying out activities	0.0232
		Essential information for the mental health education network	0.0232
		Mental health network	0.0232
		Suitable content of network mental health education course	0.0196
		Online measurement and evaluation	0.0220
		Suitable content for online measurement and evaluation	0.0154
		Online psychological counseling	0.0214
		Suitable content of online psychological counseling	0.0137
		Online self-help and mutual assistance	0.0184
		Suitable content for online self-help and mutual assistance	0.0131
Network usage indicators	0.2625	Internet access equipment	0.0230
		Internet frequency	0.0315
		Average online time per day	0.0381
		Internet habit time period	0.0282
		Main purpose of surfing the Internet	0.0308
		Online emotional motivation	0.0249
		Online emotional experience	0.0249
		Engaging in activities online	0.0289
		Browsing content online	0.0322
Use intention and demand indicators	0.2375	Importance of network mental health education	0.0455
		The degree of need for network mental health education	0.0475
		Willingness to carry out online mental health education	0.0475
		Factors of attracting network mental health education	0.0505
		Factors affecting the development of network mental health education	0.0475
Application status and effect indicators	0.2625	Understanding network mental health education	0.0348
		Frequency of using network mental health education	0.0420
		Most used online mental health education activities	0.0354
		Effectiveness of network mental health education	0.0348
		Satisfaction degree of network mental health education	0.0420

Table 6: Continued.

Primary index	Weight coefficient	Secondary index	Weight coefficient
Educational system construction indicators	0.2375	Factors affecting the effect of network health education	0.0354
		Evaluation method of network mental health education effect	0.0381
		Suitable channels for network mental health education	0.0214
		Network mental health education is suitable for carrying out activities	0.0232
		Suitable forms of network mental health education	0.0232
		Network mental health education course	0.0232
		Suitable content of network mental health education course	0.0196
		Online measurement and evaluation	0.0220
		Suitable content for online measurement and evaluation	0.0154
		Online psychological counseling	0.0214
		Suitable content of online psychological counseling	0.0137
		Online self-help and mutual assistance	0.0184
		Suitable content for online self-help and mutual assistance	0.0131

Table 7: Demographic characteristics of survey samples (gender).

Gender	Number of people	Proportion (%)
Male	348	38.28
Female	561	61.72

Figure 2: Reliability test (educator questionnaire).
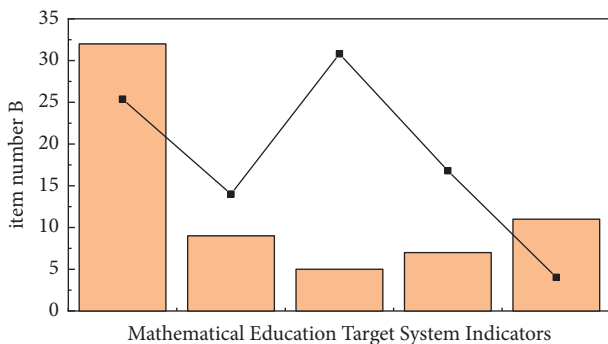
Figure 3: Reliability test (college student questionnaire).

can be approximately obtained by querying the chi square distribution table.

Table 8: Demographic characteristics of survey samples (major).

Major	Number of people	Proportion (%)
Engineering	219	24.09
Management	171	18.81
Neo-Confucianism	165	18.15
Literature	87	9.57
Economics	84	9.24
Agronomy	54	5.94
Law	39	4.29
Art studies	33	3.63
Medical science	33	3.63
Education	15	1.65
Philosophy	9	0.99

Table 9: Demographic characteristics of survey samples (grade).

Grade	Number of people	Proportion (%)
First year	339	37.29
Second year	273	30.03
Third year	171	18.81
Fourth year	90	9.90
Fifth year	36	3.96

Table 10: Demographic characteristics of survey samples (only-child).

Only-child	Number of people	Proportion (%)
Yes	219	24.09
No	690	75.91

Table 11: Demographic characteristics of survey samples (place of origin).

Place of origin	Number of people	Proportion (%)
Countryside	483	53.14
City	426	46.86

Table 12: KMO and Bartlett's test (educator questionnaire).

Kaiser–Meyer–Olkin measurement of flow velocity		0.722
Bartlett's sphericity test	Approximate chi square	590.794
	df	300
	P	0.000

Table 13: KMO and Bartlett's test (college student questionnaire).

Kaiser–Meyer–Olkin measure of sampling adequacy		0.798
Bartlett's sphericity test	Approximate chi square	1298.768
	Df	351
	P	0.000

Table 14: Education objective system (educational values).

Education objective system indicators	Number of people	Proportion (%)
Values with the educated as the main body	15	44.12
Values with educators as the main body	4	11.76
School-centered values	4	11.76
Values with society as the main body	11	32.35

Table 15: Education objective system (education concept).

Education objective system indicators	Number of people	Proportion (%)
People-oriented concept	14	41.18
Comprehensive development concept	9	26.47
Concept of quality education	6	17.65
Personalized concept	3	8.82
Open concept	2	5.88

Table 16: Education objective system (training objective).

Education objective system indicators	Number of people	Proportion (%)
Popularizing mental health knowledge	8	23.53
Improving college students' mental health quality	14	41.18
Identifying and finding psychological problems	8	23.53
Prevention and reduction of psychological crisis	4	11.76

4.3. Validity Test of Educators' Questionnaire. As shown in Table 12, the KMO test score of the teacher questionnaire was 0.722, the Bartlett sphericity test value was 590.794, and the p value was 0.000 ($P < 0.01$), indicating that the questionnaire was suitable for analysis.

4.4. Validity Test of College Student Questionnaire. As shown in Table 13, the test score of KMO's test students is 0.798, the score of Bartlett's spherical test is 1298.768, and the p value is 0.000 ($P < 0.01$), indicating that a questionnaire is needed for identification.

As shown in Tables 14–16, 44.12% of educators believe that the values with the educated as the main body should be established, and 32.35% believe that the values with the society as the main body should be established. Most educators believe that they should adhere to the educational concept of all-round development (41.18%) and people-oriented (26.47%). The training objectives are to improve college students' mental health quality (41.18%), popularize mental health knowledge (23.53%), identify and find mental problems (23.53%), and prevent and reduce mental crisis (11.76%).

5. Conclusion

Through the investigation and data analysis of educators and college students, the following conclusions are drawn:

(1) Surfing the Internet has become a daily habit of college students. The behavior of using the Internet is more rational. They pursue entertainment, relaxation, and access to information. The mindset is simple and pleasant, and the mindset is further influenced by college students' interest in using online psychosocial education.

(2) Educators and college students have strong needs and willingness for online mental health education, while the low security significantly affects the needs of both sides. Although most college students have received online mental health education, their understanding, satisfaction, and effectiveness of online mental health education are still low, and there is still a large demand gap.

(3) On the basis that the needs of educators and college students are basically the same, there are also some differences. In terms of content, the needs of educators and college students are highly overlapped in self-awareness, professional psychology and career planning, interpersonal relationship, and social support. In terms of form, they all think that video and pictures are the main means. In the choice of educational channels, educators tend to prefer campus websites, while college students tend to prefer social software.

(4) In the construction of mental education in online education, educators believe that it is necessary to increase hardware products, network environment, funds, and office funds, serve as the chairman of the school party committee, the Ministry of Education, and the Ministry of Students, and have one intellectual team with mental health background.

From the perspective of the thesis and the benefits of online education, this article proposes a series of advocacy efforts aimed at improving student mental health education and promoting online learning efforts.

Data Availability

The labeled dataset used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

Interpretation of Online Artworks of Digital Art Design in the New Media Environment

Pingping Li (ID)

Zhengzhou Normal University, Zhengzhou, Henan 450000, China

Correspondence should be addressed to Pingping Li; lipingping@zznu.edu.cn

In order to realize the interpretation of online artworks, the art design of artworks is studied on the basis of new media digital environment. Through the presentation of digital works, the enhancement of dramatic art appreciation, the balanced display of art appreciation, and the enhancement of digital aesthetic creation, the interpretation of artworks has been successfully completed, which strongly supports the digitization of new media. Art design is to constantly breed an updated online art space and attract and summon more viewers' new experience, new creation, and new perception so as to trigger and develop new propositions, new exploration, and new atmosphere of new media drama. For the current construction of traditional art design, new media digital technology plays a major role. The transformation of digital technology and Internet media is another "holographic" extension of the human body, which has an extremely strong impact on new media art and comprehensively updated our life, art, and aesthetic concepts. This is not only a revolution of media but also a change of art. At the same time, it is also accompanied by the "expansion" of art theory. What this change ultimately needs to complete is the revolution of media culture that affects the development process of human civilization.

1. Introduction

The rapid development of digital technology has had a wide impact on the whole industrial chain, such as the production, dissemination, and acceptance of new media art. Particularly after entering the 21st century, the speed of high-tech renewal and iteration has accelerated, and new media art has undergone all-round changes, including the changes of aesthetic concepts and art theories. New media art, in a broad sense, is based on digital technology and digital image as the media, including films accepted by the art system as the "seventh art," television as the "eighth art," and games as the "ninth art," as well as many art forms related to film and television art, such as 3D image, VR image, and video game fusion image. New media art provides us with a new aesthetic experience mode. New media have brought about fundamental changes in aesthetic experience and changed from the dominant mode of self-sufficient object perception to the mode with specific emotional intensity as the core. To some extent, new media

make our internal movement, which proves once again their essential creativity. In the environment of "experience economy," the online artworks of new media drama need "role breakthrough." The stronger audience's drama experience is reflected in the strengthening of audience experience consciousness in traditional drama, the in-depth exploration of audience experience in cutting-edge drama, and the expansion of audience drama experience by new media performance. After the beginning of the "experience economy era," the evolution of audience experience of new media drama has evolved from "strong interaction" to "strong recognition" and from "passive participation" to "active creation." The drama experience space has appeared as "extension" and "regeneration," and the connotation of drama experience has also appeared as "transformation" and "sublimation." "Audience drama experience evolution" promotes the role breakthrough of new media drama online artworks. In the era of "experience economy," new media drama online artworks have increased, enriched, and changed their roles. "Dance role breakthrough" directly

leads to the innovation of experiential dance space in new media drama. "Audience's deep drama experience demand" is the basic driving force for the transformation of new media drama experiential dance space. "Dance role evolution" is not only the starting point but also the end point of promoting the innovation of experiential dance space in new media drama. "Unfinished space" is the soil that breeds new media drama experiential online art works. Figure 1 is an analysis of digital self-media in the field. Equilibrium can be regarded as the basis of all aesthetic principles, and other principles can be regarded as the derivation of this basic principle.

2. Literature Review

Yoo C. et al. said that the progress of digital technology not only provides a development opportunity for film and television media and film and television art but also has a strong impact on the whole "great art" theoretical system, including film and television art and other new media arts. To some extent, the process of art development is the process of continuous "expansion" of art theory [1]. Zhang G. et al. believe that "new media" has become a popular term in society, and "new media drama" has also become a hot topic in the drama circle. In the past two decades, the exploration and creation of new media drama in China have not brought a considerable scene for its prosperity. On the contrary, with the proliferation of forms or the increase of gimmicks to a certain extent, it has become controversial, and the voice of doubt and opposition seems to be even more [2]. Glava Z. et al. believe that many discussions on digital media art design focus on the application of technical tools while ignoring its artistic and cultural spirit. Therefore, we want to use the modern digital technology platform to integrate Chinese elements into digital media art design, which not only enriches the design elements but also can use the digital media communication platform to better show the brilliance of Chinese art and culture [3]. Wang X. et al. said that although digital art design has been widely used in various fields of our life because of its unique charm and nature, there is still a lack of complete theoretical system support for digital art design [4]. Therefore, Song M. et al. believe that online art works should first have the characteristics of disseminating information and visual stimulation. The so-called "visual stimulation" refers to the visual psychological process of attracting the audience's interest and naturally generating three steps in an instant, namely, stimulation, communication, and impression. "Stimulation" is to make the audience pay attention to it, "transmission" is to convey the information to the audience as soon as possible, and "impression" is the content expressed to form an image memory for the audience [5]. Bruhn J. et al. believe that, under the background of new media, the communication technology, communication carrier, and users' reading preference of news have changed to some extent. More and more elements participate in the process of art creation and communication. News writing presents different writing characteristics, and aesthetic art also permeates the process. Three-dimensional, visual, and storytelling are not only the
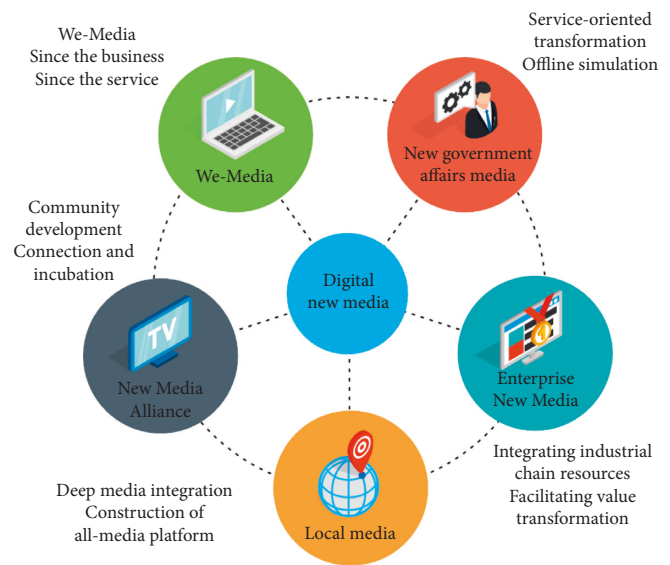
FIGURE 1: Analysis of digital self-media in the field.

aesthetic and artistic embodiment of new media online writing but also the transformation direction of art writing [6]. Therefore, while Gorbunova A. et al. have accumulated teaching experience, in the new media era, the coverage of news content is closely related to technology and information collection ability. Usually, in order to seize the opportunity, the news reports in the context of new media are simple and direct, but with the increasing attention of users and the mining of relevant news elements [7]. Y. Xu et al. said that the new aesthetics brought by the new media art based on digital technology and with digital image as the core has opened a new era of film and television art and image culture and put forward new challenges for the original art theory system and aesthetic system with classical art as the main interpretation object [8]. Wakelin Daniel Iyer G. et al. believe that, at this stage, there are obviously problems that need to explored, thought of, or solved. Based on the dual-era environment of "new media" and "experience economy," they focus on the perspective of online artworks of new media drama [9]. Bellalouna F. et al. believe that, under the background of "globalization" of digital information, with the development of economy and the renewal of technology, digital technology is involved in the field of art, produces computer graphics and image design works, and then is involved in dynamic film and television and digital interactive design works. After digital technology enters the art field, the boundary between "pure art" and "commercial design" becomes more and more blurred [10].

3. Method

3.1. Presentation of Digital Artworks.
Digital media art design is a new means of expression of today's digital art design. In order to better show China's original culture and artistic characteristics under the background of international globalization, the selection and application of Chinese elements is the innovation and development of today's digital information media. Therefore, the use of digital media to

show Chinese elements can better show and develop Chinese art and culture. Therefore, the perfect integration of Chinese art and digital technology can form a certain psychological formula and finally show the digital media art design with the style of Chinese national art and culture. This attempt not only shows the digital media art design with the Chinese national art design style but also provides some experimental exploration experience for the style creativity of more digital media art design in the future [11]. Reflecting the brand of Chinese national culture and making it occupy a place in the forest of world culture is an urgent problem to be considered in modern digital media art design because only the national is the world. The elements of digital media art design should reflect Chinese traditional culture and constantly improve the quality and cultivation of designers. Based on the platform provided by new technology, we use the modern digital expression to integrate traditional Chinese elements into digital. Without the intervention of external forces, it will develop self-sufficient and healthy so as to approach the essence of art infinitely. Figure 2 is the flowchart of the new media operation, and Figure 3 is the composition of the new media digital team. However, too much use of ideological standards to measure artistic creation and aesthetic thought has brought artificial class nature to aesthetics and art. At the same time, during this period, academic research was stagnant, resulting in many thinking achievements of intellectuals being "dead in the womb" and failed to appear. Based on this lesson, in the new era, we should put the discussion of art and aesthetic theory back to the field of academic research, talk about academic research, and provide "green" protection for the healthy development of academics so as to promote the emergence and birth of important aesthetic and artistic theory works in the new era [12].

In addition to the big movies watched on the big screen, as far as other new media arts in different forms are concerned, digital images have penetrated into all aspects of our daily life, and the digital images transmitted on all kinds of new media together constitute our daily life. This makes aesthetic elements integrated into daily life, and daily life can also be easily transformed into image content, which has achieved "aestheticization of daily life." New media art image has become "a fast stream of symbols and images filled with the longitude and latitude of daily life in contemporary society" [13]. Figure 4 shows the overall market scale of new media server. In this kind of image consumption behavior, the boundary between elegant art and popular art has been erased, the classical aesthetic order and artistic level have been disintegrated, the sense of sanctity of art appreciation no longer exists, and the traditional aesthetic attitude of watching quietly has gradually disappeared as the "sense of distance" between daily life and the traditional sense of film viewing ceremony. As shown in Figure 5, the propagation speed formula (1) of new media under digitization is as follows:

$$v = \frac{n}{d},$$ (1)

where d represents the communication duration, n represents the total number of news within the communication
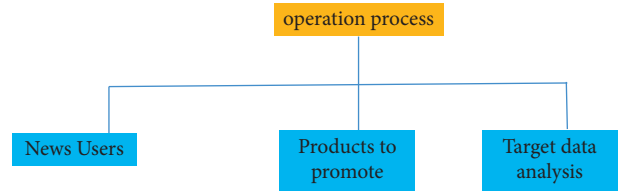
FIGURE 2: New media operation flowchart.
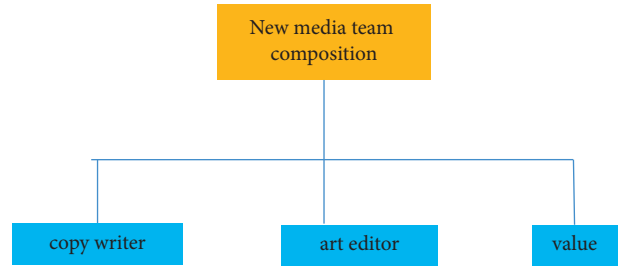
FIGURE 3: Composition of new media digital team.
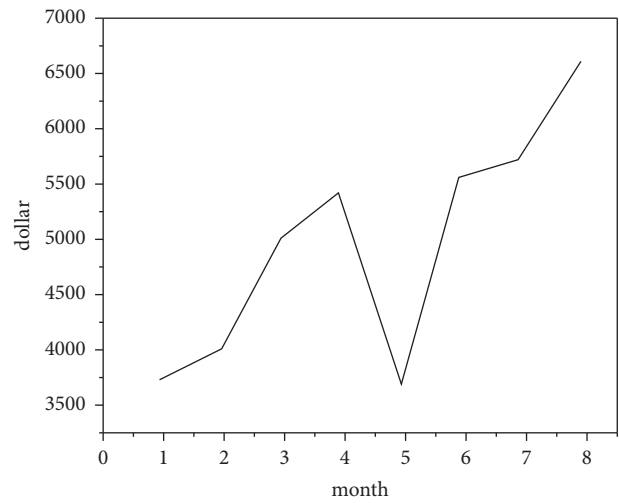
FIGURE 4: Overall market scale of new media server.

duration, and v represents the communication speed. The communication duration, communication speed, and target group coverage need to be normalized. Taking the propagation time as the target, the formula is

$$T = \frac{1}{1 + e^{-t}}.$$ (2)

According to the digital media, we can get the output formula of the design terminal under the new media environment as follows:

$$E = \frac{1}{2}(d - o)^2.$$ (3)

3.2. Enhance the Appreciation of Dramatic Art. "The evolution of dance role" is not only the starting point but also the end point of promoting the innovation of experiential dance space in new media drama. In the new media drama,
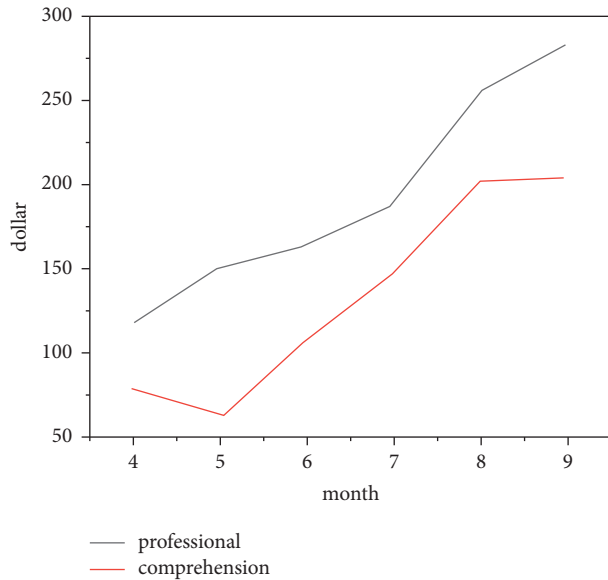
FIGURE 5: Professional and understanding of online art interpretation.

the role of stage art gradually presents multipolarization, that is, "behind the scenes" role, "script" role, "character" and "actor" role, and "director" role. Besides the "behind the scenes" role, other roles are becoming more and more important, and some roles even play a decisive role in the benign development of new media drama [14], for example, the role of "actor" and "director"; the extension or transformation of the stage art role of this kind of drama is almost difficult to see in the past traditional drama performance, which is unimaginable for the current formal or routine new media drama, and may also be based on the "actor-centered theory." "Director-centered theory" for the singing tone of the dramatic art actor or director is unwilling to imagine. In any case, the continuous embarrassment and confusion of new media drama are prompting us to think about "change," "change when poor, change when flexible, and general for a long time." The proposition of stage art of new media drama is changing, and the action of breaking the topic is bound to change. If we still use the old method to solve the new proposition, we can imagine its future. The evolution of the role of dance beauty just promotes the effective formation of the experiential dance beauty space of new media drama, forces the drama and dance beauty to move further towards the direction of audience space experience, provides a richer and more favorable platform for audience drama experience, and contains unlimited opportunities for "integrating drama space." It is in this experiential dance beauty space that the audience obtains a new understanding, then promotes the "evolution of dance beauty roles" at a higher and broader level, and continuously promotes the experiential dance beauty space into a higher level of space. It goes without saying that "dance role evolution" is not only the starting point of promoting the innovation of new media drama experiential dance space but also the end point of innovation and always makes an unlimited expedition to a higher level of "starting point" and "end point," which will be the

necessary way for the return of the noumenon of "inclusive drama space" [15]. Figure 6 shows the crisis management module for digital art interpretation.

The crisis management module is the main module of the system, which mainly realizes a series of processes in the place of digital art interpretation to ensure the value of artworks. The realization of this function directly affects the overall effect of works [16]. The flowchart of online art appreciation is shown in Figure 7.

Better integrate Chinese art and digital technology to form a certain psychological formula, and finally show the digital media art design with Chinese national art and cultural style. This attempt not only shows the digital media art design with the Chinese national art design style but also provides some experimental exploration experience for the style creativity of more digital media art design in the future. Reflecting the brand of Chinese national culture and making it occupy a place in the forest of world culture is an urgent problem to be considered in the art design of modern digital media [17]. The problems of modern digital media art design are shown in Figure 8.

The test and evaluation module is mainly used to test the interpretation of online artworks. It is an intuitive evaluation of digital new media. The main function of this module is phased inspection: phased inspection is to ensure the correct online interpretation of artworks [18]. The test evaluation module is shown in Figure 9.

User communication module is an important functional module to realize the interaction between new media management and art communication personnel in the process of art teaching activities. It is mainly used for information exchange activities between users. The module mainly includes real-time interactive online Q & A and online messages. Before answering questions, the work personnel need to create a Q & A room, and the enterprise personnel can answer questions in real time after entering the corresponding Q & A room so that they can answer questions in groups in different places and classes at the same time [19]. The user communication module is shown in Figure 10.

The system management module mainly manages user accounts, including adding users, deleting users, and modifying user information, and can assign permissions to users at the same time. System parameters can be maintained, and system data can be backed up. The function module of the background management module is shown in Figure 11.

3.3. Balanced Display of Art Appreciation. The reason why balance is called the most basic aesthetic principle is that it originates from the original heart and conforms to our most simple and classical aesthetic norms. It can best comfort the viewer's psychology and make the viewer feel comfortable and safe, just as we often say: "stability is the foundation of everything." With symmetry and balance, there is the foundation of beauty. Other aesthetic principles are the variation and derivation on this basis. Balance is to make the picture feel a physical balance psychologically through our
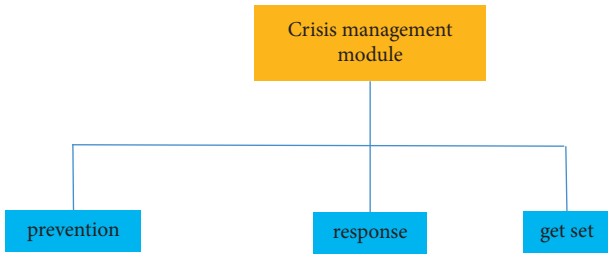
FIGURE 6: Crisis management module diagram.
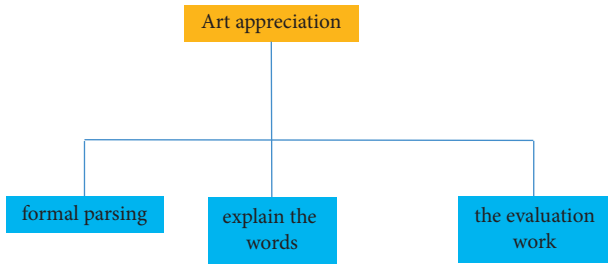
FIGURE 7: Online art appreciation.
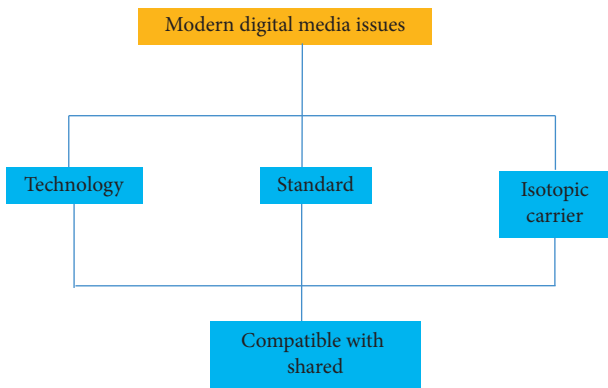
FIGURE 8: Problems of modern digital media art design.

FIGURE 9: Schematic diagram of test and evaluation module.
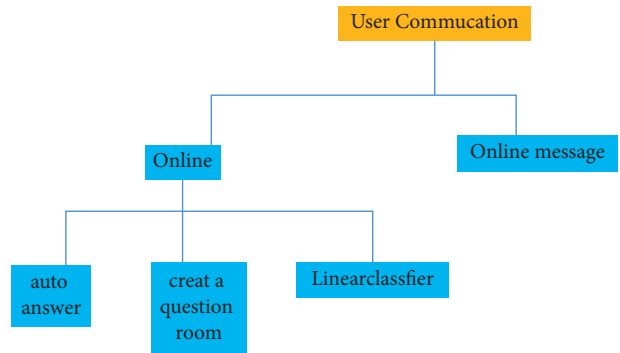
FIGURE 10: Schematic diagram of user communication module.
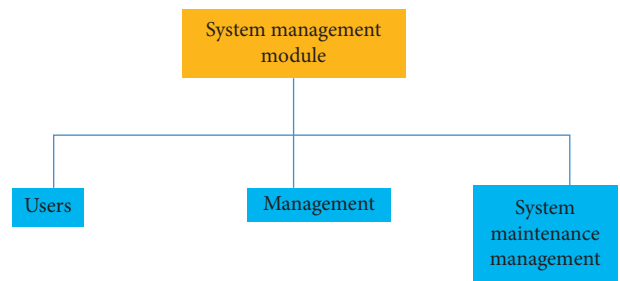
FIGURE 11: Function module diagram of background management module.

eyes through the placement and combination of various elements. Balance is different from symmetry. Symmetry gives people the feeling of "preciseness and solemnity" through formal equality, similarity, and similarity, while balance makes the picture feel "stable" through appropriate combination [20]. Balance: there are two forms: symmetric balance and asymmetric balance. Symmetrical balance is called "axisymmetric" balance. "Axis" refers to the equal weight on both sides, giving people a sense of security, stability, and solemnity. Asymmetric equilibrium means that the components on both sides of the "axis" are not equal. Using the visual law, the components on both sides of the "axis" are adjusted by changing the size, shape, distance, density, and other factors, giving people a sense of balance. This form gives people a feeling of novelty, liveliness, and strong sense of movement and has a certain appeal [21]. Figure 12 shows the balance principle of online artworks.

3.4. Enhance Digital Aesthetic Creation. The creation of art design is a process of image conception and materialization.

This process requires the creator's spiritual feelings and the accumulation of creative experience to form his own thinking. Specifically, this includes two aspects: first, the creation of art design is a process in which the creator constructs images through spiritual feelings. The "image" here not only has an aesthetic function but also permeates the specific content of social culture and contains a variety of ideas, such as politics and religion, emotion and action, mood, and expression. From this perspective, the creation of art design is the unity of image and concept [22]. Figure 13 shows the number of recent online artworks. Secondly, the creation of art design also needs the creator's personal ability and computer skills because the materialization process of "image" must be realized through design skills, such as shape, color, and texture, which is an indispensable process of forming realistic art design works. From the above description, we can know that the creation mode of art design

FIGURE 12: Balance principle of online artworks.

FIGURE 13: Recent online art creation.

FIGURE 14: Artistic image of online artworks.

audience. This kind of experience seems to be difficult to see in the existing new media drama exploration or works. More often, it is the feeling of self-entertainment of new media, which is still a long way from the truly integrated drama. To a large extent, the audience's drama experience needs to be based on the online artworks of new media drama. Without its online artworks, the audience's drama experience and inclusive drama can hardly be realized. Figure 15 shows the audience satisfaction survey of new media art interpretation. Therefore, in order to realize the effective development of new media drama, the drama experience space of its online artworks is the cornerstone and focus [24]. If new media drama leaves the drama experience space of online artworks, ignores the drama experience role of online artworks, or does not tap the rich drama experience of online artworks, it will be difficult to achieve the vigorous development of new media drama. The experiential stage art of new media drama is an indispensable link in the benign development of new media drama. As shown in Figure 16, the reading volume of dramatic artworks is compared with that of previous works. In media art design, the digital media art design is endowed with cultural connotation, and digital expression is used to reproduce the brilliance of China's traditional art.

At the same time, the digital media art design is a new means of expression of today's digital art design. In order to better show the original cultural and artistic characteristics under the background of international globalization, the selection and application of Chinese elements is the innovation and development of today's digital information media. Therefore, using digital media to show Chinese elements can better show and reduce the difference between Chinese art and culture. Only with the support of a complete theoretical system can we produce scientific ideas and concepts of digital art design. Under the guidance of these thoughts and thoughts, we can really go deep into the creation and appreciation of digital art and design so as to break through the shackles of traditional mode and give full play to the charm of digital art and design [25]. Viewing digital art and design from the fields related to our vision, we can find that digital art and design has penetrated into our lives, from electronic products to colorful web pages on the Internet and from a large number of stunts used in commercial blockbusters to common programs in computers. Therefore, based on the general understanding and analysis of digital art design, I have formed my personal analysis and opinions on its creation. The hidden formula (5) is as follows:

is related to the type of design object and the personality of the creator, so there is no common model. However, the creation of art design should also follow certain laws and conform to the universality of contradictions [23]. Figure 14 shows the artistic image of online artworks. Because different artistic design creation processes must go deep into life, collect images in personal ideas so as to stimulate the creator's creative desire and materialize the "image" in time, which is the communication process of artistic design. After computers are widely used and mankind has entered the digital era, the great influence of computers on the creative methods of art design has further deepened the creation on the original basis and formed creative methods with their own characteristics, such as algorithmic creation, simulation creation, combination of algorithmic and imitation creation, virtual reality creation, and automatic creation. The error matrix sent by the new media according to the system is shown in formula (4):

$$(Y - DX)^2_f = \left(E_K - d_k x^k_r\right)^2_f. \tag{4}$$

Among them, we only need to adjust d_k and x^k_r to realize the minimum solution of error.

3.5. Realize New Media Art Interpretation.
New media drama experience also includes the drama experience of the

FIGURE 15: Audience satisfaction survey of new media art interpretation.
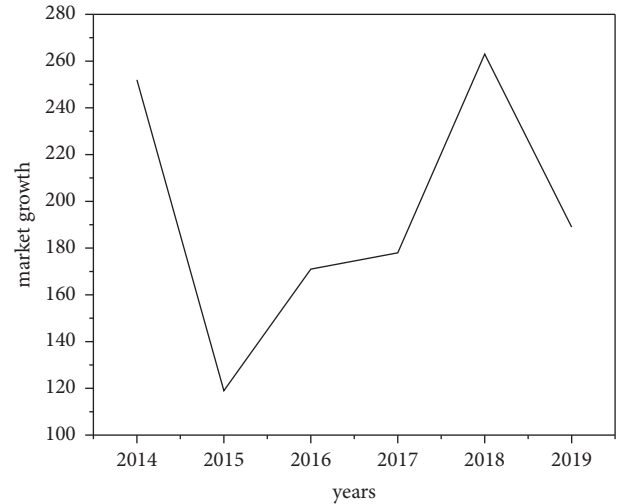
FIGURE 17: Rise curve of digital reading technology.
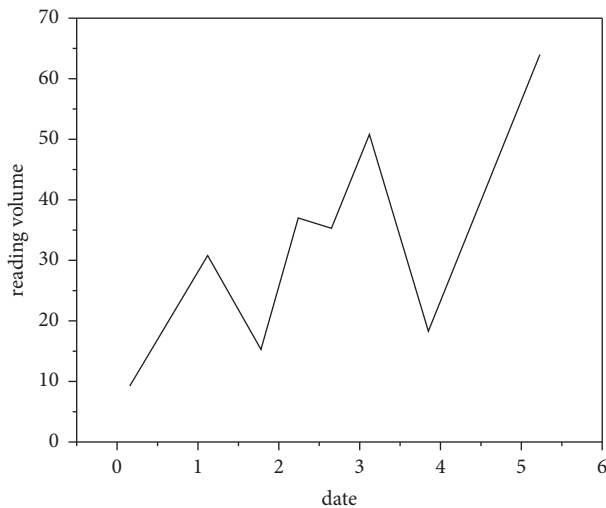
FIGURE 16: Comparison of reading volume between dramatic artworks and previous works.

$$C = M^2 \bmod n. \tag{5}$$

4. Results and Analysis

4.1. Promote the Thinking of Aesthetic Works in the New Media Environment.

Facing the tradition of realism, some people will question that the expression of digital virtual aesthetics in the form of digital technology and new media art seems to be farther and farther away from real life itself. However, the image world presented by digital aesthetics is imagined and created by people as subjects in the final analysis. The stimulation of people's imagination by virtual aesthetics can not only open up more possibility space for human beings but also meet people's spiritual needs, the spiritual needs of "virtual consumption," "imagination consumption," or "symbolic capital consumption." As another dimension of image documentary online art, there is no doubt about the rationality of the spiritual demand of this kind of consumption. In the "postepidemic era," this kind of consumption will grow rapidly. Figure 17 is a graph of the rise of digital technology. Of course, although the rise of digital virtual technology and theorists' theories on "material reality restoration theory," "realism" film view, and "asymptote" of reality have encountered challenges, films, documentaries, and art films with realism and realistic themes that can be explained by such theories will also exist for a long time. The development of art cannot be judged simply by the theory of evolution in the biological sense [26]. The relationship between art and technology, humanities and science, and technology is undoubtedly very complex, which cannot be covered by either evolution theory or value judgment. There is no doubt that the development of new media art with Internet media as the medium and digital technology as the driving force enriches and expands the territory of art, rather than reducing or splitting art. From a certain point of view, the vitality of art is contained in its huge inclusiveness and expanding territory. As shown in Figure 18, the trend chart of solving problems under new media digital technology is shown. Therefore, it is required that the construction of art theory should not only keep pace with the times, face, pay attention to, and try to solve all kinds of new problems but also be inclusive, commit to the "expansion" of art theory system, and then accommodate all kinds of contradictions and conflicts in an open art theory system and framework. Such an art theory system is open and vigorous. The tree of art is evergreen, and the vitality of art theory is with art.

4.2. Promote the Interpretation of Aesthetic Works in the New Media Environment.

After more than 100 years of development, Chinese aesthetic thought and art theory have made great progress, cultivated many people who are good in both China and the west, and appeared as classic aesthetic works in the field of aesthetics and art history. However, looking at the development history of aesthetic art and the publishing history of aesthetic art theory works, we also face many
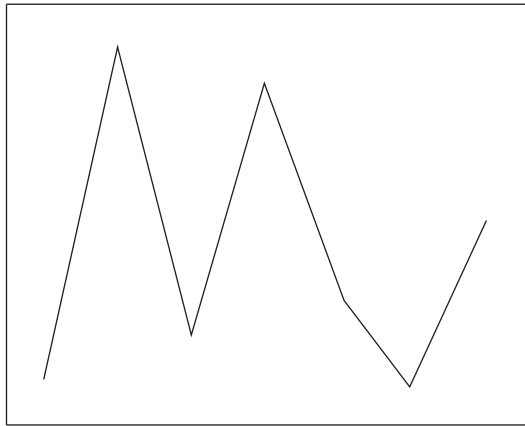
Figure 18: Trend chart of problem-solving under new media digital technology.

Figure 20: Comparison between interpretation of traditional artworks and online artworks.

Figure 19: Growth of artworks under new media digital technology.

problems that need to be solved urgently. The above are what most mainstream navigation devices lack at present, which is the significance of designing this system. Nowadays, what the audience needs most for the drama experience is to give the audience the opportunity or space to experience. Otherwise, the audience's drama interpretation is impossible, and the experiential online art is even more on paper. The essence of "unfinished space" is to breed opportunities for the audience's drama experience, provide space for the audience's online interpretation, and enable the audience to actively experience drama in this kind of drama space. And under the organic brewing of drama creators, attract and summon the audience to enter the unfinished space form of drama experience, and this unfinished space state will be open, continuous, and even never complete (and cannot be completed). Its purpose is to constantly breed an updated online art space and attract and summon more viewers' new experience, creation, and perception. Figure 19 shows the growth of artworks under new media digital technology and the comparison with traditional art interpretation so as to trigger and develop new propositions, new exploration, and

new atmosphere of new media drama. This open characteristic of "unfinished space" is undoubtedly a high-quality soil for online interpretation of art. Figure 20 is a comparison of interpretation of traditional artworks and interpretation of online artworks.

5. Conclusion

Chinese aesthetic thought and art theory began at the end of the 19th century and the beginning of the 20th century. The centennial development history of Chinese aesthetic thought and art theory is not only a process of self-construction by absorbing western aesthetic and art resources but also a period of coexistence of various aesthetic thoughts and schools. In this century of development, works on aesthetic art theory have been published continuously, which not only represents the research results and development status of China's aesthetic thought and art theory in different stages but also has important enlightenment significance for the development of later aesthetic thought and art theory. The transformation of digital technology and Internet media is another "holographic" extension of the human body, which has an extremely strong impact on new media art and comprehensively updated our life, art, and aesthetic concepts. This is not only a revolution of media but also a change of art. At the same time, it is also accompanied by the "expansion" of art theory. What this change ultimately needs to complete is the revolution of media culture that affects the development process of human civilization. Media culture "constructs our daily life and ideology and shapes our ideas about ourselves and others; it restricts our values, emotions, and understanding of the world; it constantly makes use of high and new technology and appeals to market principles and universal nonpersonalized audiences. In a word, media culture condenses communication and culture into a dynamic process and coerces everyone.

Data Availability

The labeled dataset used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

Research on Citizen Participation in Government Ecological Environment Governance Based on the Research Perspective of "Dual Carbon Target"

Shiyong Chen [1] **and Nan Liu** [2]

[1]*School of Marxism, Southwest Medical University, Luzhou 646000, Sichuan, China*
[2]*School of Law, Southwest Medical University, Luzhou 646000, Sichuan, China*

Correspondence should be addressed to Nan Liu; kwgl5618@swmu.edu.cn

As the people's demand for a better life is getting higher and higher, citizens' requirements for the rural ecological environment are also constantly improving. At present, the deterioration of many rural environments and the cross-flow of sewage have brought great challenges to the governance of the rural ecological environment. Therefore, the improvement in the ability and level of rural ecological environment governance is the key to winning the battle of rural ecological environment governance, and the participation of citizens in rural ecological environment governance is even more crucial to the improvement in the ability and level of rural ecological environment governance. At present, academic achievements on rural ecological environment governance are increasingly enriched, but there are few academic achievements on rural ecological environment governance from the perspective of citizen participation. Since public participation in ecological environment governance is still in the initial stage of development, there are many factors that affect the effective implementation and development of public participation in the ecological environment. For example, various factors such as the imperfect legal system related to citizens' participation in rural ecological environment governance, weak awareness of citizen participation, and difficulty in determining the methods of citizen participation seriously hinder citizens' participation. Improve the theme awareness and ability of citizens to participate in ecological environment governance and to improve the citizen participation mechanism in my country's rural ecological environment governance. By analyzing and discussing the problems and countermeasures of public participation in environmental governance in my country, it is of positive significance to promote citizens' participation in ecological environmental governance.

1. Introduction

The year 2020 marks the 15th anniversary of General Secretary Xi Jinping's statement that "clear waters and lush mountains are invaluable assets" and is also a decisive year in China's battle against pollution. Highlighting the key points of ecological and environmental governance and making up the weak points of ecological and environmental governance are the key points in the battle against pollution. China's rural areas are not only populous, but also wide and diverse, which is not conducive to the rapid improvement in rural ecological environment governance level. In 2021, the seventh national census showed that the population living in rural areas was 509.79 million, accounting for 36.11%. The huge population has become one of the great obstacles to improving the level of rural ecological environment management in China.

After citizens' participation in rural ecological environment governance, the role of citizens has undergone a fundamental change: citizens have changed from the role of "being controlled" to the role of "being in charge of their own affairs" and "self-examination and introspection." Therefore, allowing citizens to participate in the governance of the local ecological environment is not only the transformation of citizens as "masters of their own affairs," but also the self-satisfaction of citizens for political rights,

enabling them to experience the rights and responsibilities granted by the constitution. Citizens are the destroyers and guardians of the local ecological environment [1]. Only by changing citizens' way of life and production, enhancing citizens' awareness of environmental protection, enabling citizens to understand the ways and means of protecting and managing the ecological environment, and changing their inherent way of life, can citizens become real "green citizens." By allowing citizens to participate in rural ecological environmental governance, we can further cultivate the backbone of China's environmental protection. Standardizing the ways and methods of participation of all parties can not only promote the development of rural ecological environmental governance and save social governance costs, but also achieve a virtuo [2].

2. Concept Definition and Theoretical Basis

2.1. Concept Definition

2.1.1. Ecological Governance. Ecological governance is the process of rectifying, cleaning up, restoring, and beautifying the ecological environment in the process of ecological civilization construction, with the goal of achieving ecological civilization; green technology innovation as the driving force; and government-led social organizations, enterprises, and institutions; and individual citizens, the process of participation [3]. Through ecological environment governance, behaviors that affect or even cause serious damage to the ecological environment should be deeply managed and constructed under the condition of maintaining a stable ecological environment. To a certain extent, improving the ecological environment can comprehensively improve the living environment of citizens.

2.1.2. Citizen Participation. The domestic definitions of civic participation mainly include: that public participation in all activities that citizens try to influence public policy and civic life; and that civic participation refers to a series of behaviors related to citizens trying to influence government decision-making activities through channels within the political system. Public participation emphasizes the two-way communication and consultative dialogue between decision makers and stakeholders affected by the decision [4]. Based on the above definition, civic participation has the following characteristics: citizens participate through certain participation mechanisms or channels, citizens influence policy systems and public affairs or affect civic life, and citizen participation is a positive behavioral activity. Therefore, this article defines citizen participation in ecological governance as a series of positive behaviors in which citizens affect policy systems, public affairs, or citizens' lives through certain participation mechanisms or channels.

2.1.3. Dual Carbon Goals. The "dual carbon" target is my country's updated nationally determined contribution strengthening target in accordance with the "Paris Agreement" and a long-term low greenhouse gas emission development strategy for the mid-21st century. It climbs from fast to slow, fluctuates at an inflection point of zero annual growth, and then continues to decline until anthropocentric sources and sinks balance out. The process from carbon peaking to carbon neutrality is the process of carbon dioxide emissions from relative decoupling to absolute decoupling of economic growth. My country strives to achieve the peak of carbon dioxide emissions before 2030, the carbon dioxide emissions per unit of GDP will drop by more than 65% compared with 2005, the proportion of nonfossil energy in primary energy consumption will reach about 25%, and the total installed capacity of wind power and solar power will reach more than 1.2 billion kilowatts and achieve carbon neutrality by 2060. During the "14th Five-Year Plan" period, energy consumption and carbon dioxide emissions per unit of GDP will be reduced by 13.5% and 18%, respectively. Promoting the decarbonization, electrification, and intelligence of the energy and power system; the conversion of low-carbon fuels (in areas that cannot be electrified); and the application of negative emission technologies are the basic paths to achieve carbon neutrality before 2060.

In recent years, my country is seeking a more sustainable, inclusive, and resilient economic growth mode and already has the objective conditions to achieve the peak of carbon emissions before 2030. As the only major economy to achieve positive economic growth in 2020, my country shoulders the heavy responsibility of leading the "green recovery" of the world economy. In 2020, my country's total economic output will account for about 17.39% of the world's total, and carbon dioxide emissions will account for about 29% of the world's total emissions. In 2020, my country's total economic volume has reached a major step of one trillion yuan, and the strong national comprehensive strength has laid a solid economic foundation for the realization of the "dual carbon" goal. Achieving carbon peaking and carbon neutrality is an extensive and profound economic and social transformation, and the Party Central Committee has a clear understanding of this big test. Compared with developed countries, my country has a tighter time frame, greater scope, more difficulties, and extremely arduous tasks to achieve the "dual carbon" goal. It requires both courage to face adjustment and wisdom to overcome difficulties. There is a long way to go to create a new paradigm of development.

2.2. Theoretical Basis

2.2.1. Synergy Theory. Synergy theory mainly studies how an open system that is far from the equilibrium state spontaneously emerges an ordered structure in time, space, and function through its own internal synergy when there is material or energy exchange with the outside world. Synergy theory is based on the latest achievements of modern science—system theory, information theory, cybernetics, and catastrophe theory—absorbs a lot of nutrition from the theory of structural dissipation, and adopts the method of combining statistics and dynamics. Based on the analysis, a multidimensional phase space theory is proposed, a set of

mathematical models and processing schemes are established, and the common law of the transition from disorder to order in various systems and phenomena is described in the transition from micro to macro. Mainly biased towards three aspects, namely, conflicting multiple and contradictory subjects; transforming contradictions into cooperation methods; and achieving a harmonious, collaborative, and win-win situation, the three complement each other and are indispensable. Therefore, the author believes that in citizens' participation in the governance of the rural ecological environment, in order to adjust the conflicts of interests caused by the ecological environment problems of multiple subjects such as "citizens, township grassroots governments, rural production and operation cooperatives (capital), and non-governmental environmental protection organizations," a mutual benefit must be achieved. Multiple measures and multiple ways should be coordinated with rural ecological environment governance issues to achieve a win-win situation and a beautiful ecological environment. Citizens' participation in rural ecological environment governance from the perspective of synergy is in essence; under the condition of consensus and coordination of multiple subjects, grassroots governments improve and decentralize power, grassroots people coordinately manage ecological and environmental affairs and improve the collaborative management under the grassroots mass power system. The synergy theory has come to fruition in my country and is playing an important role in all aspects of social governance.

2.2.2. Governance Theory. American Scholar Box is a pioneer of civil governance theory. In his book "Civil Governance: Leading American Communities in the 21st Century," he criticized some views of the new public management theory and repositioned citizens, government decision makers, and administrative professional management. The role of three persons are as follows: citizens become direct participants and controllers of public affairs because of their positive citizenship, not just service objects of government affairs; government decision makers are transformed from single commanders and controllers to active promoters; and administrative professional managers should not try to control the government and public institutions, but should play a supporting role in promoting citizen participation. At the same time, it is believed that the government should transform the bureaucracy in the traditional sense, empower citizens with more rights, and put forward four principles of citizen participation, namely scale, democracy, rationality, and responsibility. Citizens can only be guided by these four principles. Public participation will play its effectiveness [5].

Governance theory strongly advocates diversified management: usually, the cooperation between the government, social organizations and groups, the market, and individual citizens is strengthened by means of divisions such as levels and stages to form multiple co-governance subjects. In addition, through the emphasis on government reform and function transformation, and the introduction of competition mechanism advocacy, various governance bodies are interconnected and independent of each other and share responsibilities to achieve common goals [6]. The proposal of governance theory is a manifestation of the progress of human thought, and it has been applied in various fields around the world, namely social governance, population governance, environmental governance, ecological governance, and network governance. Therefore, pluralistic co-governance is a new paradigm of ecological governance, and it is also a process of collective participation and collective decision-making. Citizen participation in ecological governance is a manifestation of the diversification of governance subjects. Therefore, based on governance theory, this article explores the issue of citizen participation in the ecological governance of Ziwuling National Forest Park in Gansu.

2.2.3. Stakeholder Theory. Stakeholder theory was gradually developed in Western countries around the 1960s, and its influence expanded rapidly after the 1980s, began to influence the choice of corporate governance models in the United States and the United Kingdom, and promoted corporate governance, changes in management style. The reason for the emergence of the stakeholder theory is its profound theoretical and practical background. The key point of the stakeholder theory's foothold is that it believes that with the development of the times, the status of the owners of physical capital in the company is gradually weakening. The so-called weakening of the status of material owners means that stakeholder theory strongly challenges the traditional core concept that a company is owned by individuals and institutions that hold common stock in the company. Originally applied in the field of economic management, with the development of related research, this theory has gradually developed into the field of public management and has been widely used in the research of government, citizens, and nonprofit organizations in the third sector. In the environmental field, all citizens live in it. As the direct bearers of ecological changes, they have the most say in ecological governance in the face of ecological damage. Therefore, the stakeholder theory is an important theoretical basis for citizens to participate in ecological governance [7]. In order to realize the long-term development of the country in the government's ecological governance, it is necessary to incorporate multistakeholders into the ecological governance.

2.3. The Basic Status of Chinese Citizens' Participation in Rural Ecological Environment Governance

2.3.1. Increasing Awareness of Environmental Protection. Comparing the "Citizens' Ecological and environmental Behavior Survey Report" for 2019 and 2020, the proportion of respondents to the topic of "concern about ecological environment" increased by 10%–20% (Figure 1).

It can be seen from the above picture that the ecological environment awareness of Chinese citizens is gradually improving, as shown in Figures 2 and 3. There are many channels for Chinese citizens to obtain information, among which the Internet, radio, and neighbors are important information sources. Specific information acquisition channels are shown
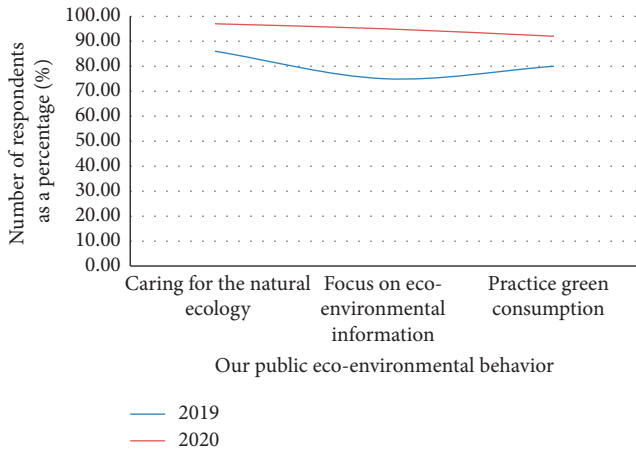
Figure 1: Comparison of public ecological environment behavior in China.
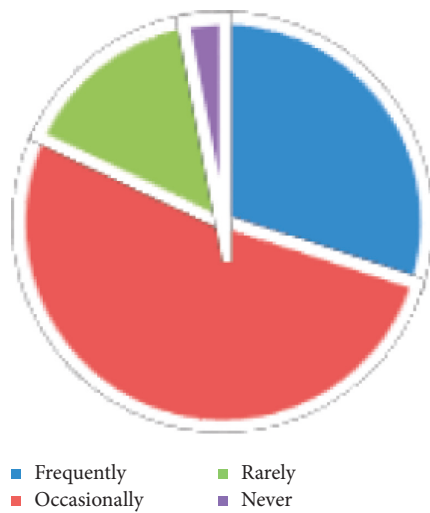
Figure 2: Citizens' attention to environmental events.
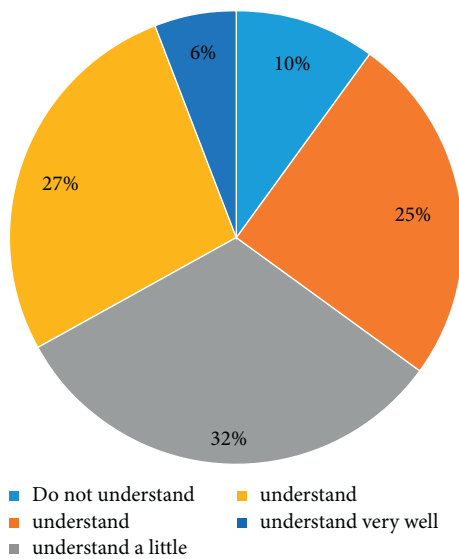
Figure 3: Degree of citizens' understanding of ecological governance.
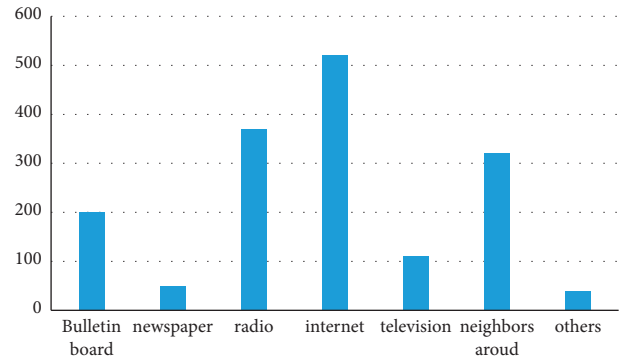
Figure 4: Access to information for citizens.

in Figure 4. Although the respondents in the "Citizens' Ecological Environmental Behavior Survey Report" involved a large number of urban residents and township citizens, the 2019 "Report" clearly pointed out that the respondents were in different work units, indicating that urban and rural concerns. For differences in ecological environment information, compared with national or regional ecological environment information, citizens pay more attention to the ecological environment information that is closely related to their living places, as shown in Figures 5 and 6.

2.4. Enhanced Participation Ability. In recent years, the ability of Chinese citizens to participate in rural ecological environment governance has gradually increased, mainly reflected in the gradual enhancement of the public's behavior of "practicing" ecological environmental protection. The ability of Chinese citizens to practice ecological environment governance has risen. From the Survey Report on Citizens' Ecological Environment Behavior (2020), respondents generally believe that their environmental protection behavior is very important to protect the ecological environment. Therefore, citizens attach great importance to low-carbon travel and energy conservation and enthusiastically participate in supervision and reporting and environmental volunteering activities. However, the respondents' practice in the fields of green consumption, reducing pollution, paying attention to the ecological environment, and sorting garbage is relatively poor. However, compared with 2019, the practice of the public in my country has increased by about 10% as shown in Figure 7. The specific data are shown in Figure 8.

The rate of rural sewage treatment in China has increased. In 2019, according to relevant media reports, the sewage treatment rate in rural areas of Shanghai has reached 75%, and the phenomenon of sewage discharge in rural areas has been greatly improved, making it the highest sewage treatment rate in rural areas of China. China's garbage disposal capacity has increased. As shown in Figure 8, according to the data of the National Bureau of Statistics from 2012 to 2019, China's garbage harmless treatment capacity increased year by year. During the same period, the treatment capacity grew slowly and reached 240,128,000 tons in 2019, and its daily treatment capacity reached 869,875 tons.
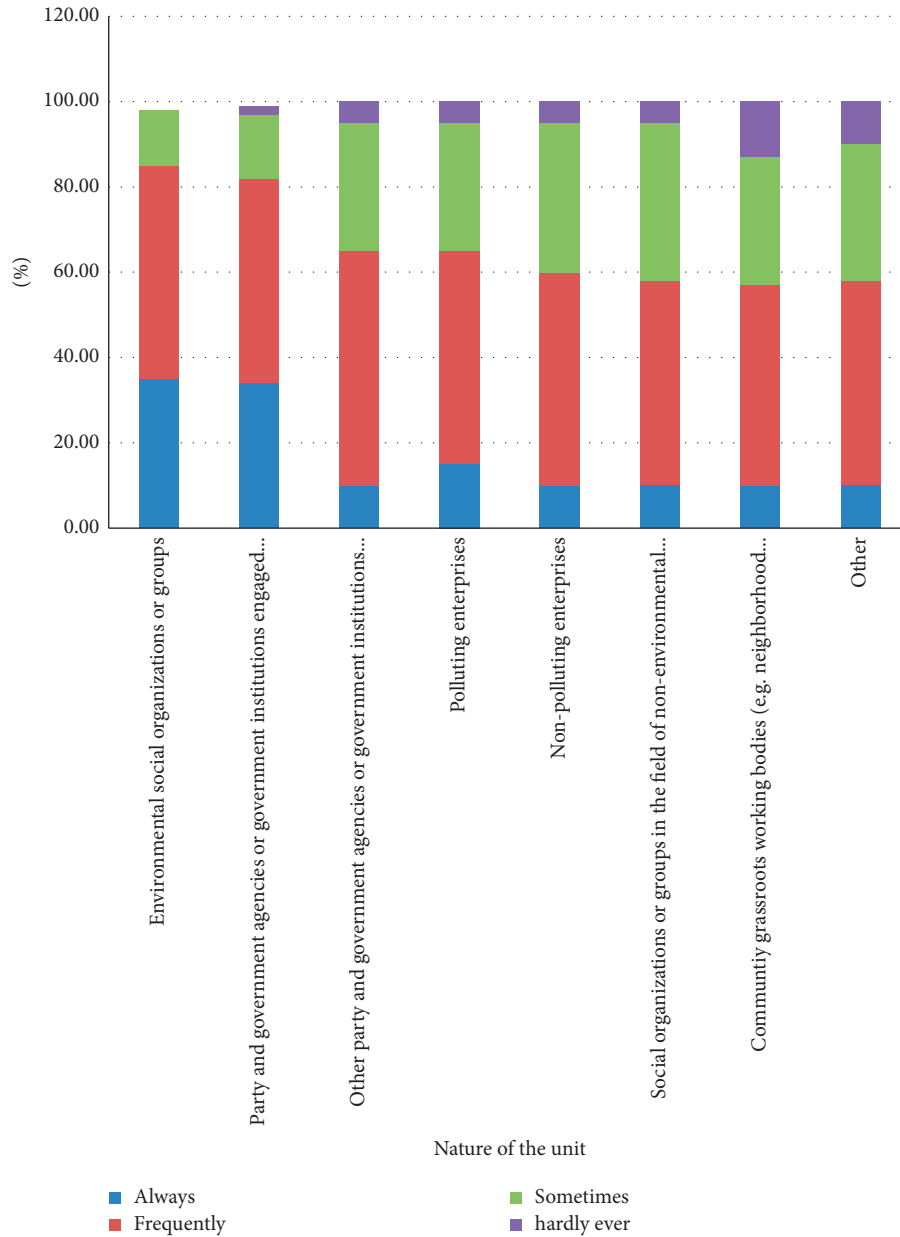
FIGURE 5: Interviewees in different units pay attention to ecological environment information.

2.5. Citizen Participation Channels Are Not Smooth.

Citizens' participation in ecological governance has long been valued in Western countries, and the relevant laws and regulations are relatively complete. For example, the United States promulgated the "National Environmental Policy Law" as early as 1969, which guarantees citizens' right to participate in environmental protection. In addition, the developed countries, such as France and the United Kingdom, that have risen in the second industrial revolution have legally clarified the status of citizens' participation in environmental protection [7]. In these countries, citizens participate in ecological governance in various ways, and the participation channels are relatively smooth. They can participate through formal channels organized by government organizations, or through social organizations or spontaneous informal channels [8]. Participation methods provided by the government include hearings, seminars, and public surveys and timely release of relevant information on ecological governance; informal participation is led by social organizations and ordinary people, who participate in demonstrations, sign signatures, and contact the media; and the opinion is conveyed to government administrators. In contrast, the effective channels provided by local governments in my country are relatively simple; there are few channels for participating in environmental governance-related activities to truly play a role, and institutionalized channels such as symposiums and hearings are less open, especially in grassroots local governments, many of which are formalistic. At present, social environmental protection organizations have played an important role in ecological
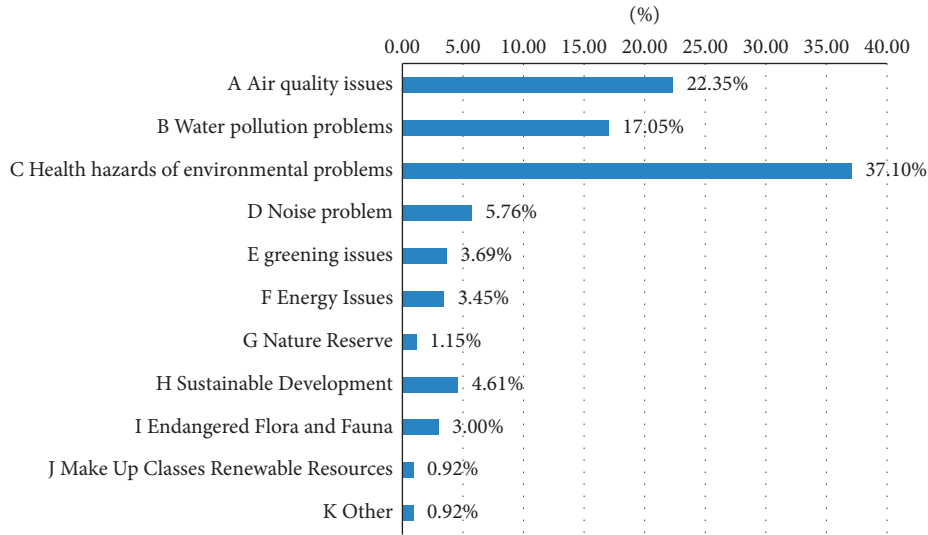
Figure 6: Different interviewees focus on ecological and environmental governance.
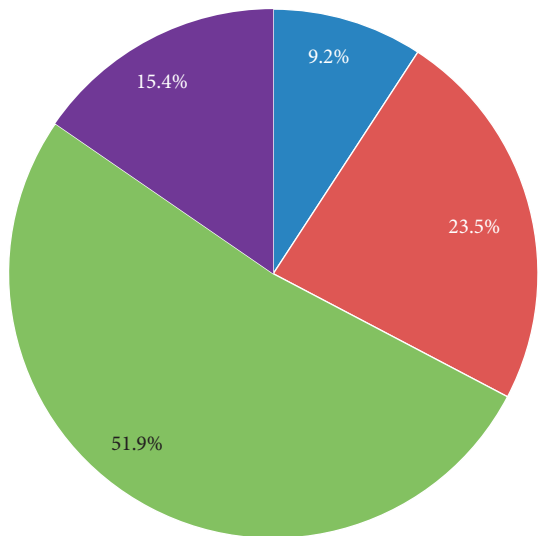
Figure 7: Enthusiasm for citizen participation.

Figure 8: Changes of harmless treatment capacity.

governance in Western countries. They have participated in ecological governance by raising funds, volunteering, and influencing government interest groups. However, in my country, social environmental protection organizations are far from developing. It is far behind developed countries, and its role is limited. Most of the grassroots people passively participate in government-led activities such as environmental protection popularization and publicity, but their active participation is poor, and the effectiveness of the participation path is not guaranteed. At present, the channels of participation of citizens in administrative decision-making in my country are not smooth, which leads to

the prominent problem of disorder, the process of participation is more complicated, and the effect of participation is far from expected, which seriously affects the confidence and enthusiasm of citizens to participate in administrative decision-making. Due to the interference of various factors in real life, citizens' participation in administrative decision-making is seriously formalized, and the expected participation effect cannot be achieved.

On the one hand, poor participation leads to disorderly participation, which is mainly manifested in noninstitutionalized participation. Citizens who could have participated in administrative decision-making in a legal and standardized way, due to their own lack of understanding and biased thinking, forcibly participate in a disorderly manner to administrative decision-making. Among them, the most prominent ones are disorderly petitioning, illegal assembly, irrational participation through violence, and making rumors. Investigating the reason, we found that for citizens who participated in disorder, the deviation in ideology and understanding led to a certain misunderstanding of the

government's open and reasonable behavior of allowing citizens to participate. Violent and malicious participation is an attempt to force the government to achieve its own goals through brutal means. These illegal, violent, and excessive behaviors will seriously damage social harmony and even endanger social security.

On the other hand, the lack of smooth participation channels has a negative impact on citizens' confidence in participating in administrative decision-making. Although citizen participation has been in-depth development in the process of building and developing a service-oriented government in recent years, in many cases, citizen participation is only a formality, and the rights and positive effects of citizen participation have not been fully exerted. In the Maoming PX incident, it was because of the lack of effective channels for participation, that the citizens finally took the method of protesting by marching. Although the development of the Internet has provided a convenient channel for citizens to participate, the effectiveness of local network participation at the grassroots level is still open to question, and the path for citizen participation is not smooth. Governance is also a long-term and arduous project. If this aspect cannot be effectively solved, it can be said that governance work is impossible [9]. There is still room for improvement in the willingness and participation of Chinese citizens, as given in Table 1.

2.6. Citizens Lack Ecological Knowledge.

Ecosystem is a biological and environmental interrelated interaction and the formation of an organic and unified whole itself has certain cycle, if human needs are beyond the load of the ecosystem, will appear forests, grassland degradation, soil erosion, environmental pollution, climate anomalies, and species extinction phenomenon, affecting people's production and living. Human beings are an important factor in the cycle of the ecosystem, but for a long time, people have insufficient understanding of the ecological law and have not been alert to the ecological imbalance. They still blindly develop and utilize natural resources, causing the ecological environment in some areas to be difficult or impossible to recover and serious ecological problems [10]. Only when citizens have a scientific understanding of ecological knowledge, such as ecological environment, ecological system, ecological crisis and ecological law, can we better talk about the improvement in citizens' ecological awareness and the protection and governance of China's ecological environment [11]. My country is in the primary stage of socialism. By the end of 2020, a well-off society will be fully realized, which is also a critical period for the construction of a service-oriented government. There is still a big imbalance in the progress of social development, and there is also an imbalance in the overall quality of our citizens. The uneven comprehensive quality of citizens will be directly manifested as insufficient understanding of the content of policy issues, inability to make rational and correct judgments in choosing participation methods, and inability to fully understand the results of decision-making with a normal mentality. These phenomena will adversely affect the healthy development of civic participation and even damage the public interest. The comprehensive improvement in the comprehensive quality of citizens requires the joint efforts of society, the government, and individuals, and improving the comprehensive quality of citizens is an important prerequisite for improving the ability of citizens to participate and realizing democratic participation.

Ecological behavior is an actual behavior in which people put their understanding, cognition, and emotion of ecological environment in daily life into certain ecological practice. At present, Chinese citizens have a lot of bad environmental behaviors in their daily life. For example, the government advocates the concept of "low-carbon life," but in real life, we see too many non-"low-carbon" behaviors of citizens: throwing away waste batteries, using disposable tableware, driving when going out, and being obsessed with fur [12]. In fact, low-carbon life involves people's clothing, food, housing, transportation, and other aspects; the long-formed living habits and consumption patterns cannot be the reason for citizens to reject low-carbon life, as long as they improve their living habits, take the initiative to restrain themselves, and save all kinds of resources around, they will leave everyone's "carbon footprint." Otherwise, these non-environmental behaviors will become the root of ecological and environmental problems. Therefore, we should construct the daily ecological norms of citizens and develop good ecological behaviors of citizens.

2.7. Lack of Legal Guarantee for Citizen Participation.

Gradually in recent years, the citizen participation in the form of diversity, in addition to being able to rely on the people's congress system, political consultative system and the grassroots autonomy system, and other countries outside the political system to participate in government administration, democratic appraisal government, government officials, online q&a, and policy hearing form also gradually rise, but in the construction of local government, a large part of become a mere formality, the lack of actual effect. In addition, citizen participation is usually related to policy development, water and electricity prices, and demolition of housing, but it is rare to apply it to ecological environment governance [13]. Some local governments believe that ecological governance is an activity with the government as the main executioner, and ordinary people have neither professional knowledge nor the ability to participate in it. Therefore, it is unnecessary to introduce the public into government governance. This led to the process of ecological management in local government, and there are no relevant laws and regulations to provide protection for citizen participation; the social reality of this lack of security makes some people to express their interests in the ecological regulation, of the unsoundness of informal ways involved in the government management, and also brought the government's governance. The deficiencies of the current legal system of citizen participation in China are mainly reflected in: (1) the constitutional guarantee of citizen participation is not perfect. The definition of citizen's participation right in the constitution of our country is vague and there is no

TABLE 1: Public participation intention and participation method.

Participation comments	Proportion (%)	Participation method	Proportion (%)
Very willing	47.5	Promote environmental knowledge	11.59
More willing	36.82	Participate in the public welfare activities of the government and social organizations	34.32
Reluctance	12.5	Start from the smallest things around you to protect the environment	51.36
Does not matter	3.18	Suggestions for pollution control rules and regulations	2.73

guarantee provision, which is very unfavorable to the protection and development of citizen's participation right. Due to the lack of the right to guarantee the formal participation path, a large number of people have to participate in the informal path. Most participants do not get normative guidance, and the disorderly nature of informal participation leads to the formation of mass incidents and harm to public security. (2) The specific field of civic participation is not clear [14, 15]. Although the law guarantees citizens' participation, the current law does not specify the specific areas in which citizens can participate and does not specify what kind of government affairs the public can participate in, and if so, what procedures, processes, and channels should be used to participate, which are lacking in the current laws and regulations. To some extent, it hinders the actual participation of the public. (3) Lack of legal enforcement. The law points out the specific ways in which citizens can participate in State Administration in China, but it lacks legal effect in the specific implementation of participation. However, it is difficult to play a role in the actual process of government governance. Social forces and citizen groups can communicate with the state authorities through legal communication channels. Improving the legal system of citizen participation is an important prerequisite for the effective participation of citizens. Without the protection of the legal system, citizens' right to participate is easy to be ignored and trampled. The rule of law is a major national policy requirement of the country. In the process of social management, the government should further improve the citizen participation system and law according to the requirements of the times and the public. Let the public have the opportunity to participate in the government's actual ecological governance [16].

3. Suggestions on Strengthening Citizens' Participation in Ecological and Environmental Governance

3.1. Raising Citizens' Ecological Awareness. The experience of economic development and environmental protection in Western developed countries has given us a lot of enlightenment. To do a good job in cultivating citizens' ecological consciousness, we should broaden our international vision and draw lessons from foreign advanced ecological education experience. At the same time, we should combine China's specific national conditions and reality to find out the similarities between foreign countries and the cultivation of Chinese citizens' ecological consciousness and build a cultivation model with Chinese characteristics to shape the modern ecological consciousness of Chinese citizens,

advocating the government-led training model. In 1970, more than 20 million people participated in the social demonstration of environmental protection in the United States, which was unprecedented in terms of the scale of rallies and mass participation, as well as the improvement in citizens' ecological awareness and the impact on the world's environmental history. This movement greatly brought into play the power of citizens' extensive participation in ecology, triggered the reform of citizens' ecological concept, and improved citizens' ecological consciousness. Obviously, this approach to cultivate citizens' ecological awareness is worth learning from [17]. At present, Chinese citizens have weak ecological awareness and a lack of ecological consciousness. Therefore, it is urgent to cultivate the ecological consciousness of Chinese citizens to take the initiative to undertake relevant environmental protection affairs. The government should play a leading role in overall planning, setting up specialized training institutions, and providing more economic support. The cultivation of Chinese citizens' ecological awareness is temporarily dependent on the guidance of the government. With the popularization of the cultivation of ecological awareness and the enhancement of citizens' awareness level, citizens will gradually develop conscious ecological awareness, and the era of national environmental protection is expected, relying on the nurturing power of community organizations. The high level of ecological consciousness of foreign citizens lies not only in the bottom-up ecological education mechanism and ecological practice, but also in the spontaneous leading and exemplary role of various nongovernmental organizations in society. Since the 1980s, community organizations in Western developed countries have played an increasingly significant role in the education of environmental protection and ecological civilization. The UK adopted self-government early on, allowing residents to be their own masters and take good care of the environment as if they were their own homes. This kind of autonomous community organization brings together a large number of people, integrates many educational functions, edifies and strengthens citizens' strong environmental awareness, and creates an atmosphere of ecological environmental protection in which all members participate and the whole people consciously. In contrast, Chinese community organizations are only in the initial stage, and under the administrative intervention of the government, they are not fully equipped with personnel, and carrying out ecological activities is just a government action with strong purpose and lack of consciousness and initiative. In the new era, community organizations can carry out multichannel and multiform environmental protection publicity and education activities under the administrative

guidance of the government. Community organizations should constantly optimize the personnel structure and professional quality improve the ecological awareness, professional ability, and management level of community workers. Community is an important carrier of social management. As the most basic social grassroots organization, community can give full play to its social capital advantage in the process of direct communication with citizens, which plays an important role in further popularizing and enhancing the ecological awareness of Chinese citizens. Implement the educational means of co-governance of Germany and France. Singapore enjoys the reputation of "garden city," on the one hand, due to the government's high attention to and management of environmental protection affairs, and on the other hand, due to citizens' deep awareness of environmental protection [18]. To cultivate citizens' ecological awareness in China, we should also learn from Singapore's successful experience and adopt the method of co-governance between Germany and France. Through the compulsory and binding nature of law, we should get rid of all kinds of nonstandard behaviors in the field of ecology, establish mechanisms and systems with legal effect, establish citizens' ecological legal consciousness, and gradually realize the scientific and legal cultivation of citizens' ecological consciousness. Meanwhile, by a variety of publicity and education, a good environment is created for the cultivation of ecological consciousness among citizens, making them gradually establish an idea of an ecological legal system, enhance their ecological personality and quality, make them role models of environmental protection and ecological behavior, and train and develop them in accordance with the socialist core value system.

3.2. Expanding Ecological Awareness Education. The original ecological concept of citizens is changed and the education level of citizens' ecological awareness is improved. At present, China's ecological awareness education level is still in its infancy. In the new stage, citizens' ecological awareness education needs to be improved in terms of educational content, methods, subjects, and objects. First, enrich the content of ecological awareness education. At present, the level of ecological awareness education in China is still in its primary stage, with small scale, imperfect system, low influence, and low education level. In the new stage, the education of citizen ecological consciousness needs to be improved in the aspects of education content, mode, subject, and object. First, enrich the content of ecological awareness education. At present, the main content of ecological awareness education in China is the popularization and education of popular science knowledge about ecological environment, which helps to provide basic knowledge for the cultivation of ecological awareness of citizens and improve their ecological awareness level. In the new era, citizens' ecological awareness education should constantly integrate new contents and strengthen the education of citizens' ecological national conditions, ecological legal system, ecological tourism, ecological consumption, and other contents [19]. The education of ecological national conditions is to publicize and educate citizens about the current situation and problems of China's ecological environment. Ecological legal education is to enable citizens to understand the relevant laws and regulations of ecological environmental protection. Ecological consumption education is to advocate the concept of green consumption, pay attention to the harmony between man and nature, and save resources and consume scientifically while pursuing a comfortable life. Ecotourism education is to instill ecotourism knowledge to tourists, guide tourists' ecological values and behavior patterns with a definite aim, reduce their unnecessary personal needs and consumption, awaken tourists' strong ecological consciousness, and make tourists become rational and full of feelings of ecotourism. Second, the way of ecological awareness education is improved. At present, the main methods of ecological awareness education in China include school curriculum education, media publicity, and personnel training. In the new period, we should innovate the way of ecological consciousness education and realize the organic combination of explicit education and implicit education. Explicit education is to inculcate and publicize the content of ecological education to the educators through collective teaching, training, and thematic discussion activities through open propaganda and educational means, so as to improve their ecological awareness. Implicit education is to integrate good ecological consciousness into specific behaviors and habits of daily life in the way of spring breeze and rain, or a scene or a story, and consciously practice the concept of ecological protection. Being civilized, loving the environment, and consuming less can make citizens truly understand the importance of the ecological environment to human existence and realize harmony between man and nature. It is an effective way to strengthen the ecological consciousness of Chinese citizens to combine the explicit theme education with the hidden life infiltration and make the education of civic ecological consciousness constantly perfect in practice. Third, the subject and object of ecological consciousness education is expanded. At present, the main body of ecological awareness education in China is relatively single, which is mainly undertaken by schools. To this end, all resources and forces, including government, enterprises, nongovernmental organizations, and mass media, should be mobilized through multiple channels and at multiple levels. Here, the government can play a leading role to ensure the smooth development of educational activities; mass media can play the role of information platform to expand the popularization of ecological education; enterprises can realize green production and circular economy mode by improving employees' ecological literacy; and nongovernmental organizations should be good at communication to implement educational activities. At the same time, the object of ecological awareness education should be continuously expanded [20]. In school education, the whole process of education from kindergarten to university is realized, and everyone at every stage experiences ecological awareness education.

3.3. Strengthening Government Guidance. Positive guidance is to strengthen the government to foster citizen participation in the ecological practice ability that can improve the

level of citizens' ecological consciousness education to a certain extent, the citizens' ecological consciousness change and enhanced; however, citizens' ecological consciousness shape cannot just stay on theory education level; it is a practical problem, be badly in need of citizens in the practice of the ecological environment governance in China, local ecological cultivation. In the new era, the government should strengthen the positive guidance and cultivation of citizens in order to improve citizens' ecological awareness from the perspective of ecological and environmental collaborative governance. One is to enhance citizens' awareness of participating in ecological practice. As an agricultural country with a history of thousands of years, influenced by traditional economic, political, and culture, the citizen' ecological knowledge is still very scarce, the ecological idea is narrow, the ecological environment in collaborative governance problems often exist, and passive and obedient negative mentality leads some citizens to participate in the process of ecological practice which often show that it cannot participate in or displacement of mind. This has greatly hindered citizens' ecological practices and affected ecological environmental governance activities.

Strengthening the status and participation of nonprofit organizations and grassroots institutions and guiding citizens to actively participate. Debate mechanisms and dialogue mechanisms for civil participation can be appropriately set up to strengthen communication between government departments and citizens. The Internet can be used to encourage nonprofit NGOs to open corresponding public opinion polling forums, and the government can also open forum channels through official channels. The interests and groups represented by each organization are different. Through the forums of each organization, citizens can find the decision-making topics they are interested in and conduct public opinion surveys and statistics based on the status of the interest groups represented by each organization. This approach simplifies the classification process after the government collects information, improves the efficiency of information collation, enables citizens to obtain corresponding feedback faster, and promotes citizen participation; government departments can also further understand where citizens stand and from which aspects After consideration, corresponding administrative demands will be put forward. In this way, the government can consider the environmental background of citizens and propose better solutions or appeasement when dealing with slightly conflicting opinions.

3.4. Improve the Legal System and Enhance the Rule of Law. Deng Xiaoping once pointed out that in order to protect the people's democracy, the rule of law must be strengthened, and democracy must be institutionalized and legalized, so that the system and laws will not change due to changes in leaders, nor changes in leaders' views and attention. The report of the 19th National Congress of the Communist Party of China also clearly pointed out that: we must adhere to the organic unity of the party's leadership, the people as masters of the country, and the rule of law; expand the people's orderly political participation; and ensure that the people

implement democratic elections, democratic consultations, democratic decision-making, democratic management, and democratic governance in accordance with the law, supervision. Therefore, in order to promote civic participation, it is necessary to create a participatory democratic political and cultural atmosphere, encourage the public to establish a sense of participation, cultivate a participatory legal culture, enhance civic confidence in participation, establish a sense of participation, and transform civic participation from passive participation to active participation. A service-oriented government is a government ruled by law. At this stage, due to imperfect laws and regulations and the lack of specific implementation measures for participation in procedures, it is difficult to mobilize the enthusiasm and initiative of some local citizens to participate. To solve this problem, we must establish and improve the laws and regulations related to citizen participation, improve the democratic degree of citizen participation, and promote citizen participation.

First of all, promote citizens' participation in legislation, realize participation in the rule of law, and use special laws to protect citizens' right to participate in administrative decision-making. A complete set of legal protection system should be established for citizens' participation in administrative decision-making. From the legal perspective, citizens' participation in government management is a citizen's right, and the right of citizens to participate in administrative decision-making should be guaranteed by law. As the current stage of my country's citizens as the subject of participation has not been clarified at the legal level, the participation of citizens in public decision-making cannot be relied upon. Therefore, relevant laws should be promulgated as soon as possible to make citizens' participation in administrative decision-making legal, and the policy scope of citizens' participation in administrative decision-making should be clearly defined in law; the government and citizens' behavior should be regulated procedurally; and the forms, channels, and steps of participation should be regulated, making procedural specifications. In addition, it is necessary to clearly stipulate the remedies and solutions after the citizens' right to participate in the administration is violated and to hold accountable for the violations of citizens' right to participate in administrative affairs. Second, local governments should be appropriately encouraged to issue corresponding participation measures and regulations. In 2007, the Guangzhou Municipal Government issued my country's first standardized local management method for citizen participation in administrative legislation, "Guangzhou Municipal Regulations and Public Participation Measures." Therefore, it is necessary to establish more convenient participation methods according to local conditions and in accordance with the needs of local people. Among them, the participation process must be clearly defined, the decision-making process must be made public, a feedback system must be established, and public supervision must be accepted. For the relevant regulations and regulations extended by the Participation Law, it is necessary to make clear and feasible provisions for the participation process in combination with the actual local conditions and clarify which decision-related matters need to be determined from the three stages before, during, and after policy formulation.

Citizen participation, through which channels, how to understand the content of decision-making, and how to respond to citizens' suggestions and opinions are very important. A sound legal guarantee system can ensure that citizens' participation has laws to abide by, laws must be followed, violations must be punished, citizens' rights are guaranteed, participation events are dealt with in a standardized way, and the sustainable and sound development of citizen participation is promoted.

4. Conclusion

With the growth of people's demand for a better life, the public's demand for the rural ecological environment is also increasing. At present, the environment of many rural areas is deteriorating and the sewage is flowing, posing a major challenge to the governance of the rural ecological environment. Therefore, improving the ability and level of rural ecological management is the key to winning the tough battle of rural ecological management, and citizen participation in rural ecological management is more important for improving the ability and level of rural ecological management. Therefore, this article aims at the problems that the relevant legal systems in the current ecological governance are not perfect, the awareness of citizens' participation is weak, and the methods of citizen participation are difficult to determine, which seriously hinder the participation of citizens, to improve citizens' awareness and ability to participate in ecological environment governance to improve the citizen participation mechanism in my country's rural ecological environment governance.

Data Availability

The dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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Retraction

Retracted: The Current Situation and Innovation of News Communication under the Environment of Financial Media

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] Y. Wu, "The Current Situation and Innovation of News Communication under the Environment of Financial Media," *Journal of Environmental and Public Health*, vol. 2022, Article ID 3440217, 10 pages, 2022.

Hindawi

Research Article

The Current Situation and Innovation of News Communication under the Environment of Financial Media

Yu Wu ID

Media and Communications College of Weifang University, Weifang 261000, China

Correspondence should be addressed to Yu Wu; 20112110@wfu.edu.cn

In order to solve the problem of news communication innovation in the financial media environment, meet the update needs of news communication in the financial media environment, and make up for the shortcomings of the application of emerging media technologies in news communication, it is necessary to improve people's attention to news communication. With the advent of the era of integrated media, the application of emerging media technologies such as data news and robot news to the field of news communication has shaken the status of TV news in communication and affected its news production mode, but it will not replace traditional news, become the "forced mechanism" of traditional news production reform, and boost its reform and promotion. According to the social survey of 100 people, it is found that 88 people believe that under this competition mode, the development and challenges of TV livelihood news coexist. As Yu Guoming, a professor at Renmin University of China, said, "people's livelihood news is in the process of becoming a butterfly." TV people's livelihood news practitioners should reshape their news ideals and establish Internet thinking to face the ever-changing communication ecological environment. From channel expansion to content integration, from serving users to public opinion guidance, we are committed to building a new mainstream media with the guidance of traditional TV media, content advantages, equal communication, real-time interaction, and distinctive personality of new media. Only in this way can we obtain enough voice and influence in the highly competitive media environment.

1. Introduction

The development of financial media has broken the unequal relationship between traditional media communicators and audiences, and the boundaries are not as clear as before. The information between the two gradually began to flow in two directions, more of which was the relationship of cooperation and common influence. Under this background, the traditional TV people's livelihood news has also been affected. The serious loss of audience, the decreasing advertising cooperation, and the gradual reduction of viewing share are the thorny problems faced by people's livelihood news.

In his representative works "the Republic of the Internet" and "information UTO," the famous American scholar Sonstein said that in the process of information dissemination, because the public's own information needs are not omnidirectional, the public only pay attention to what they choose and their pleasant communication field. Over time,

they will shackle themselves to a "cocoon" like a cocoon. Due to the existence of "selective psychology," users tend to contact information consistent with their own position and deliberately avoid information inconsistent with their existing position [1]. Personal choice of information has obvious tendency, without considering comprehensiveness; cling to oneness and homogeneity, and reject information of heterogeneity and diversity. In this way, the receiver will fall into the situation of self-imprisonment and self-closure, forming the "information cocoon room" effect [2]. With the advent of new media in the era of integrated media, TV livelihood news can be divided into three different stages, as shown in Figure 1.

2. Literature Review

Young, S. J. and others said that media integration is realized under digital technology and network technology,

and the content, channel, terminal, and organization penetrate and blend with each other at different levels [3]. Different media are trying to integrate the market in terms of ownership and organizational structure while organically combining content, technology, channels, and terminals. The definition of media convergence was first put forward by Chen, Z. Its original meaning refers to the trend of multi-functional integration of various media, which is the interactive relationship between traditional media such as radio, television, newspapers, and periodicals [4]. Hazay, C. said that "media integration" in a broad sense includes the integration of all media-related media functions, means of communication, organizational structure, ownership, and other organic elements [5]. Olubiyi, I. A. believes that the "integrated media" formed by media integration is a communication concept, which is different from the disadvantages of one-way communication in the past, and transmits video, audio, text, and pictures in a variety of media [6]. Ajagekar, A. believes that different media carriers can be used to comprehensively integrate different media such as radio, television, and newspapers with common points and complementarities in terms of channel, content, and communication, so as to realize the emerging media of "resource exchange, content compatibility, mutual integration of publicity, and common prosperity of interests" [7]. Masson, E. believes that it seems that under the production cycle system of TV news programs, the host's own expression is seriously restricted and bound [8]. Zeif, R. said that news anchors broadcast more with the text content of news manuscripts and often lack the evaluative language under self-cognition [9]. Gong, X. believes that in live news programs, most news anchors are only responsible for the broadcast and reading of news manuscripts, and only a few hosts occasionally participate in the processing of manuscripts and the critical expression of personal views, which is often more true than the broadcast and reading state of manuscripts and whether the voice is fluent and smooth [10]. When news is broadcast in this way for a long time, the personal style of the news anchor is weakened, and the characteristics of the program cannot be displayed through the host's critical expression, which will also make the style of the whole program mediocre and nothing new. Because of its decision-making power to participate in a certain range of programs, the anchor system may not adapt to the situation of the news industry in the process of localization. However, we learn some of its functions, such as participating in the selection and matching of program resources and assisting the program producers in the review and modification of program content. To a certain extent, the news literacy of the anchor will be gradually improved in the working environment of the anchor system, and the overall quality of the program will also be improved in the long run.

3. Method

3.1. Internet Information Technology and Media.
At present, the Internet has penetrated into all fields of people's life. The arrival of "Web 2.0" has changed people's concept of the Internet and brought users into the world of mobile Internet [11]. According to the 41st statistical report on the development of China's Internet, as of December 2017, the number of Internet news users in China had reached 647 million, with an annual growth rate of 5.4%, and the proportion of Internet users was 83.8%. Among them, the number of mobile network news users reached 620 million, accounting for 82.3% of mobile Internet users, with an annual growth rate of 8.5% [12]. As can be seen from the figure, from 3G following, 4G synchronization, and 5 g surpassing, the development of mobile Internet technology has changed the way people accept news and has also changed in the dissemination, production, and audience of TV news. The audience is more likely to receive all kinds of information, which has changed the production and broadcasting mode of TV news to a certain extent, as shown in Figures 2 and 3.

3.2. Analysis of Broadcast Program Content.
As the trump card column of a TV station's urban channel, Watch The City has been paid special attention by the TV station. In the city channel, there is the most broadcast time every day. The broadcast time is shown in Table 1.

"Watch The City" has three live programs in the morning, middle, and evening every day. "Watch The City" morning edition is from 7:00 to 8:00 in the morning, "Watch The City" noon edition from 11:30 to 12:30, "Watch The City" evening edition from 18:00 to 19:00, and "Watch The City" Economic Life Edition from 22:30 to 23:30. The broadcast covers all aspects of people's livelihood, from the interpretation of national policies to the demands of people's life. It tells the things around people. At the same time, the source of news materials is not only the contributions of journalists, but also people can provide real-time news materials for columns through their mobile phones and other mobile terminals. The whole column is more like an information porter around the people, truly realizing the ideological line of "from the masses to the masses" [13]. In the same period of time, the audience rating of the high-frequency version is also different. The ratings ranking in recent 6 years is shown in Table 2. The viewing share in recent 6 years is shown in Table 3.

With such a high audience share, its broadcast content is more successful than other people's livelihood news columns in the city. The reason for its success is to pay attention to the proportion of people's topics in the program; pay attention to the relevant information of people in a province, such as clothing, food, housing, and transportation; pay attention to people's humanistic, emotional, and living conditions; pay attention to the decentralization of discourse power; pay attention to the speech of people in the program; express with ordinary and diversified voices; pay attention to the interaction between the program and the audience; and pay attention to the people's livelihood, life, and humanity in the broadcasting of serious news such as national events [14].
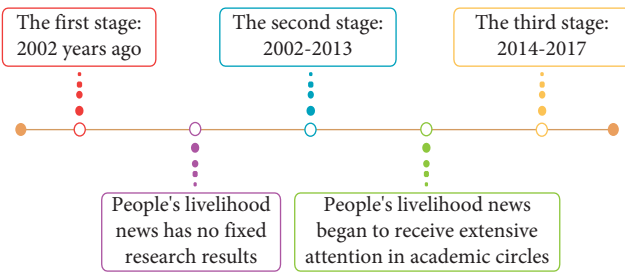
Figure 1: Development process of people's livelihood news.
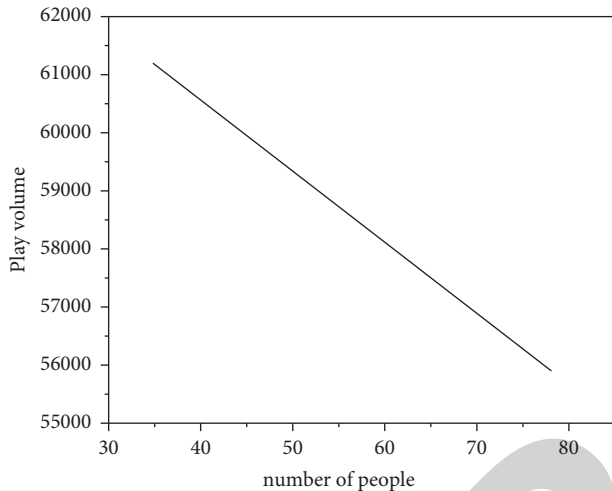
Figure 2: China's online news users in 2016.
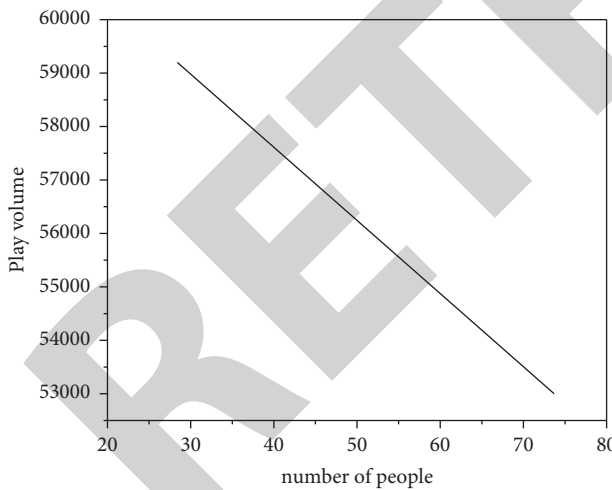
Figure 3: China's online news users in 2017.

As the people's livelihood news micro-blog platform of prefecture-level municipal TV stations, the official micro-blog of "Watch The City" can develop into a new media platform with nearly 100000 within two years, with strong communication ability [15]. This is closely related to the fixed fans of the program. Among these fans, there are more fans who pay attention to 1–1.5 years and 0.5–1 years, 28.19% and 22.91%, respectively, as shown in Figure 4.

Table 1: Daily broadcast time period of "Watch The City."

Playback period	The name of the "Watch The City" column in different time periods
07 : 00--08 : 00	"Watch The City" morning edition (live broadcast)
11 : 30--12 : 30	"Watch The City" midday edition (live broadcast)
18 : 00--19 : 29	"Watch The City" evening edition (live broadcast)
22 : 30--23 : 30	"Watch The City" (Economic Life Edition)

With the resource advantage of nearly 100000 fans, the official micro-blog of "Watch The City" has also become a better diffuser of people's livelihood news. At the same time, the official micro-blog maintained a high number of blogs. As of December 31, 2017, the total number of blogs of "Watch The City" was 9692, and the average daily number of blogs was about 23. Among them, the number of original microblogs is more than that of forwarded microblogs, as shown in Figure 5.

There are also fixed fan groups on various platforms. As of December 31, 2017, the number of fixed fans of "Watch The City" on the main live broadcasting platforms is shown in Table 4.

It can be seen from the above table that although each live broadcast platform has a fixed number of fans, the number of fans is not large. This problem is also the bottleneck faced by "Watch The City" in the early stage of exploring the live broadcasting platform. How to attract more fans and enhance the communication force, "Watch The City," still needs to make greater efforts [16].

In the context of media integration, the "two sessions" report of Fujian Daily focuses on the issues most concerned by the people, making the livelihood issues closely related to the people's lives become the news theme to reflect the voice of the people. This change in communication topics not only brings the distance between the "two sessions" and the people, but also highlights the implementation of the "people's nature" principle of Fujian Daily's news publicity work, as shown in Table 5.

With the continuous development of financial media technology, the short video industry has risen rapidly and become an industrial outlet. The reasonable duration and friendly content of short video and vlog just meet the pursuit of personalization in the new media environment and meet the usage habits of new media users. It can be described as the product of Internet thinking. Local party newspapers also conform to the trend of the times, cater to the needs of the public for efficient access to information, and more in the "two sessions" news reports, choose short videos, vlog, and other forms to show the first scene of the "two sessions" news reports to the audience. At the same time, with a more daily and colloquial language style, they shorten the distance between the audience and the "two sessions." In January 2019 to April 2020, the increment of TikTok fans is shown in Table 6.

During the "two sessions" in 2020, short videos have gradually become the leading actress in the original mobile products of Fujian Daily, "Funiu takes you to watch the two

Table 2: Ratings ranking of "Watch The City" in recent 6 years.

Column	2013	2014	2015	2016	2017	2018
"Watch The City" morning edition	1	2	7	8	3	3
"Watch The City" midday edition	17	22	10	40	12	10
"Watch The City" evening edition	1	1	1	1	1	1
"Watch The City" (Economic Life Edition)	18	19	37	14	25	31

Table 3: Ranking of audience share of "Watch The City" in recent 6 years.

Column	2013	2014	2015	2016	2017	2018
"Watch The City" morning edition	11.21	12.55	5.71	3.88	7.01	8.44
"Watch The City" midday edition	2.31	2.01	2.94	0.55	2.71	4.08
"Watch The City" evening edition	20.11	19.04	14.77	13.49	15.88	15.62
"Watch The City" (Economic Life Edition)	1.19	1.81	0.23	2.66	0.11	0.51
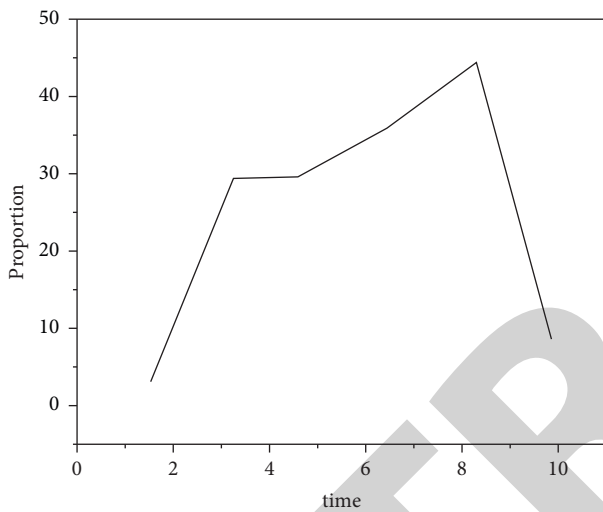
Figure 4: Analysis of the number of years of attention of fans on the official micro-blog of "Watch The City."

■ The number of original tweets
■ The number of tweets forwarded

Figure 5: Proportion between the number of original microblogs and the number of forwarded microblogs of the official micro-blog of "Watch The City."

sessions," "Shocking perspective! Experience the" ground flight "Around Fujian in two minutes!" Short video works such as "Come on, come on! Jump on a new Fujian disco" are produced from an innovative perspective, presenting the new atmosphere of the new era.

According to the latest data reported on the "two sessions" of the new Fujian app on the mobile terminal of Fujian Daily, during the "two sessions" of the province in 2020, the five platforms on the mobile terminal of Fujian Daily worked in the same direction and published about 310 relevant reports in eight days from the 9th to the 16th [17]. Among them, the new Fujian client has about 180 copies, 21 WeChat releases, 42 micro-blog releases, 53 TikTok releases today, and 13 videos [18] with small video. The number of reports from different platforms of Fujian Daily from 2014 to 2019 is shown in Table 7.

3.3. Rationalization Evaluation and Analysis of Network News Communication Effect Prior Data Sampling and Statistical Analysis. In order to realize the accurate evaluation of the rationalization evaluation of network news communication

effect, a priori data collection of the rationalization evaluation of network news communication effect is carried out by using the methods of big data analysis and quantitative evaluation of statistical characteristics. It is assumed that the prior knowledge of time series sampling of statistical network news communication effect rationalization evaluation data is expressed as $\{xi\}$. Arrange the quantitative distribution data of network news communication effect according to the feature set of sequence y '(n), and obtain the original sequence of rationalization evaluation of network news communication effect, as shown in formula (1). Using the adaptive regression analysis method to construct the characteristic component of the rationalization evaluation data of network news

Table 4: Number of fans on the live broadcast platform of "Watch The City."

Program name	Yingke live broadcast	Panda live broadcast	Pepper direct seeding	Youku live
Number of fans	857	524	498	377

Table 5: Number of reports on different types of topics in Fujian Daily from 2014 to 2019.

Topic type	Media type					
	Newspaper	Official account	Client	Micro-blog	Total	Proportion (%)
Politics	397	21	10	64	471	56.20
Economics	134	9	3	32	169	20.17
People's livelihood	104	3	2	13	119	14.20
Ecology	43	1	1	6	50	6.0
Legality	23	0	0	6	29	3.5
Total	701	34	16	121	838	—

Table 6: The increase of TikTok fans in one year from April 2019 to April 2020.

Date	2019.1	2019.4	2019.7	2019.10	2020.1	2020.4
Fans growth	11	49	79	134	143	155

Table 7: Number of reports on different platforms of Fujian Daily from 2014 to 2019.

Particular year	Newspaper	Official account	Micro-blog	Client	Total
2014	120	0	2	0	122
2015	120	7	2	0	122
2016	119	6	4	0	123
2017	120	1	18	2	140
2018	118	2	38	8	164
2019	106	18	56	5	167
Total	703	34	120	15	838

communication effect, study the rationalization evaluation model of network news communication effect, divide the rationalization level of network news communication effect into N levels, and obtain the adjustment model of rationalization evaluation of network news communication effect, as shown in formula (2), formula (3), formula (4), and formula (5).

$$\{çxi(jk)\} = xjk - xi. \tag{1}$$

$$\min F = R^2 + A \sum_i \xi i. \tag{2}$$

$$\text{s.t: } \|\phi(xi) - 0\|^2. \tag{3}$$

$$\max \sum_i aik(xi, xi) - \sum_i \sum_j aia jK(xi, xj)\sqrt{a^2 + b^2}. \tag{4}$$

$$\text{s.t: } \sum_i ai = 1. \tag{5}$$

The above formula is expressed as a normal distribution function. O is the inertia weight of the statistical characteristic distribution of the network news communication effect. Considering the statistical characteristic prediction value of the rationalization evaluation of the network news communication effect, the factor analysis of the rationalization evaluation of the network news communication effect is carried out in combination with the multivariate linear fusion method. The load of data sampling is shown in

$$B_{N \times 1} = S_{N \times L} \bullet T_{L \times 1}. \tag{6}$$

Through autocorrelation feature matching, the statistical features of the rationalization evaluation of network news communication effect are obtained. There is a mapping relationship between the predicted nonlinear statistical features RN and XN, as shown in

$$p(R^N = ri) = P(X^N = xi). \tag{7}$$

$$p(R^N = ri) = P(\text{angle}(ri) - \phi g)\bmod(2\pi). \tag{8}$$

The statistical average analysis method is used to construct the big data model for the rationalization evaluation of network news communication effect, and the descriptive statistical analysis method is used for the positive correlation analysis of the sampled big data. The mutual information transfer function description of the rationalization evaluation of network news communication effect is shown in

$$I(X^N; Z^N) = H(X^N) - H(X^N|Z^N). \tag{9}$$

$$? = H(X^N) - H(X^N|Z^N) - H(\phi G|Z^N). \tag{10}$$

When the effect of network news communication is rationalized, the number of iterations V of quantitative recursive analysis of statistical big data is the minimum. When $VVT = IM$ has a minimum value, set the value of inertia weight o for propagation effectiveness evaluation, as shown in formula (11).

$$w = w\max - t\frac{w\max - w\min}{T\max}. \tag{11}$$

Wmax and Wmin, respectively, represent the regulation coefficient of the rationalization evaluation of network news communication effect, Tmax is the maximum control time

scale, and t is the random number of hops of the rationalization evaluation of network news communication effect. In the vector space of m dimension, the statistical characteristics of the rationalization evaluation of network news communication effect are analyzed, and the statistical model is obtained, as shown in

$$w = w(t) * w\text{start}. \tag{12}$$

$$w = w(t) * \frac{1}{w\text{end}}. \tag{13}$$

The vector quantization decomposition of media factors is carried out by linear exponential analysis method, and the decomposition form is shown in

$$\text{s.t} \sum_{(i,j) \subseteq E} gij - \sum_{j \subseteq V} gji. \tag{14}$$

$$\sum_{(j,i) \subseteq E} g^e ji = T\theta_i^e. \tag{15}$$

Use ▲Mij ($i = 1, D; j = 1, N$) to represent the contribution of the rationalization evaluation of network news communication effect. Combined with the descriptive statistical analysis method, the related factor modeling of the rationalization evaluation of network news communication effect is realized [19].

To some extent, the impact of the new media era on the traditional TV media is devastating. If we cannot find ways and methods to move forward together in the multi-channel of media integration, the limitations of traditional media communication methods and effects will inevitably affect our own development and progress in a long time. Therefore, TV people's livelihood news should continuously and deeply explore the communication effect after media integration in the process of media integration, so as to ensure that the TV people's livelihood news after media integration can maintain lasting program vitality under the new media integration environment [20].

Media environment is a social situation, which includes all factors that may affect the development of media. The concept of media environment originated in the 1960s and was put forward by Canadian communication scientist Marshall McLuhan [21]. This makes the initial media environment defined as the expression of a social situation. Media environment is a social situation, which includes all factors that may affect the development of media. Then, according to Posman's definition of media environmentology, "media environmentology studies human communication, the information and information system of human communication. Specifically, media environmentology studies how the media affects people's perception, emotion, cognition and value, and how our interaction with the media promotes or hinders our chances of survival." Under the background of the rapid development of media integration, TV people's livelihood news needs to clarify ideas, find appropriate methods to conduct in-depth exploration, and grow and progress in a new media environment [22].

TV people's livelihood news always adheres to the principle of "content as the soil" to produce and build programs. However, in the face of the impact of new media, the TV livelihood news program with the original content of "trump card" is facing the disadvantages that the timeliness of program resources is not as fast as network media in the environment of new media. In the face of the media environment of financial media innovation, the traditional TV media has also changed to the strong position of information resource provider in Japan. Now we also need to face the transformation of the way of supplying program information together with the new media on the Internet [23]. First of all, we need to make it clear that the branding of TV livelihood programs is a prerequisite to ensure that TV programs can get a share in the all media era when they are kidnapped by ratings. Today's TV media providers, under the overall situation of the integration of new media, in addition to the high-quality guarantee of self-made news programs, the video forwarding of the official WeChat public platform of the program, and the sharing and interaction of program micro-blog should also ensure the overall awareness of high-quality programs. Only by ensuring the quality of program content and packaging, the ratings and advertising sponsorship of TV livelihood news programs can maintain stable development to a certain extent [24].

According to Philip Kotler, an American marketer, "a brand is a name, term, symbol or pattern, or a combination of them, which is used to identify the products or services of a seller or a group of consumers and distinguish them from the products or services of competitors." Brand is a concept in marketing, but it also plays a great value in the development and layout of the TV media market. Just like in daily life, we buy different goods in supermarkets according to our own understanding of brands. The branding strategy of TV livelihood news programs is to strive for high returns from advertising sponsors and the audience's conventional qualitative thinking means for program experience [25]. For example, Zhejiang Radio and television station have positioned its own satellite TV channel as "China Blue—the first dream channel." According to the theme of the dream, it has created a variety show "China Dream Show" to help ordinary people realize their dreams. According to its own brand strategy, it attracts the sponsorship of advertisers, so as to promote the balanced development of other TV programs on the channel. TV people's livelihood news should also learn to optimize the "trump card" of its own programs, so as to achieve the brand strategy of ensuring the rapid development of programs. The strategic way of transitioning from programs to successful brand programs also needs to mature under the influence of program arrangement, innovation, brand power, publicity, and competitiveness [26], as shown in Figure 6.

At present, the integration of traditional media and new media is still running in and adapting to each other. For TV news programs with high brand value, trying more brand-new interactive experiential activities will give loyal viewers a higher degree of program loyalty and satisfaction. It is nothing more than an exploratory attempt to transform the
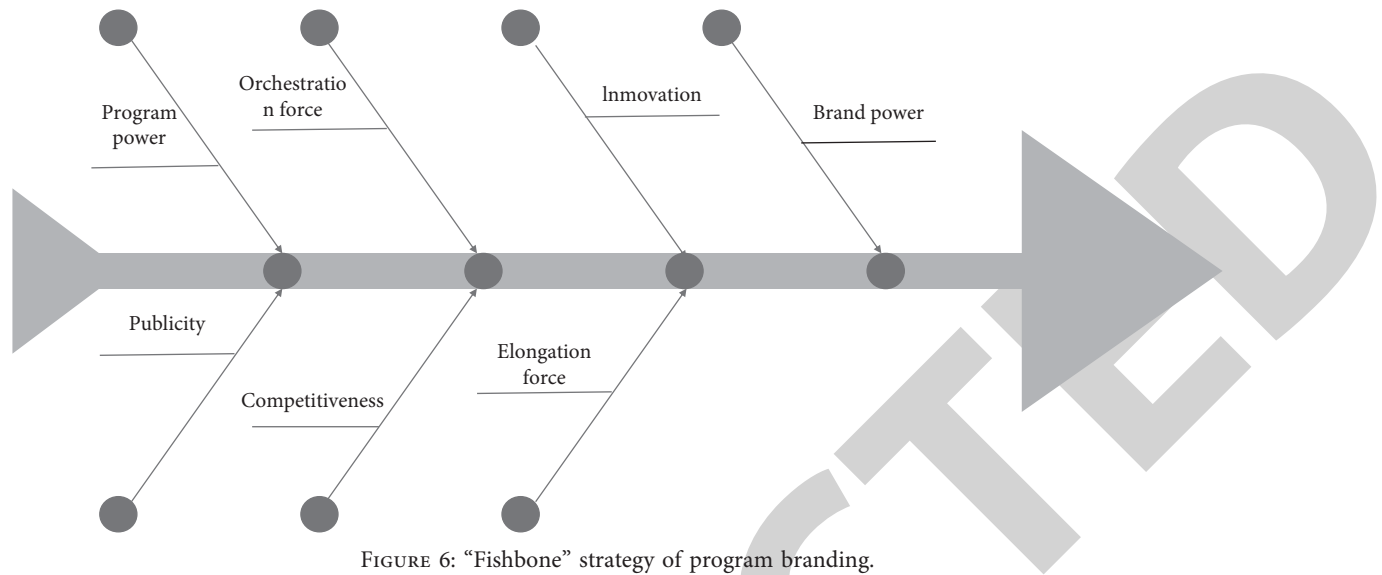
Figure 6: "Fishbone" strategy of program branding.

audience from a single audience who pays attention to the people's livelihood news of TV programs to consumers who trust the brand credibility of TV programs. This is also a successful TV news program. From the acquisition of information focusing on people's livelihood to the secondary dissemination of people's livelihood information based on the power of brands, it can deeply explore the competitiveness of program brands [27].

Young TV audiences are more likely to participate in the online and offline brand interaction experience of the program through the dissemination of new media. In the interactive process of the column group, the satisfaction of the audience and the sense of existence of the program are greatly increased, and a good activity experience is obtained in the program. Then, in the offline communication process of the brand program, the column group itself should pay more attention to the brand derivative communication effect of the program, bring good user experience to consumers, and then ensure the legitimate rights and interests of consumers.

For the in-depth exploration of media integration, we need to further deepen the in-depth expression of communication influence. The people-friendly characteristics of TV people's livelihood news are incomparable advantages of other types of news, but we should also be aware of how to have a strong objective and fair perspective in the process of news reporting in addition to being considerate of the people's suffering. This also puts forward new improvement ideas for the people's livelihood TV news under the background of new media, because the host broadcasting type of TV people's livelihood news programs is mostly the popular "say" news in recent years, which has stimulated the audience's interest in watching. However, we should also think about whether the people-friendly "say" news has broken the fairness and authority of the news. Therefore, in the report of TV people's livelihood news, we should also pay attention to the richness and diversity of topics, and avoid repeated and typed life trivia,

because to a certain extent, it will also make the audience cause aesthetic fatigue in the viewing process, and it is difficult to become a brand name program in the evolution process of program form.

With the development of information processing, storage and transmission technology, and the low threshold of information production, a large amount of information is increasingly flooded in the Internet. In the context of massive, quantitative, and even astronomical information, users' attention has become an extremely scarce resource. From the perspective of users, it is extremely laborious to obtain valuable information for their own use from a large amount of information. From the producers and disseminators of information, how to make their information stand out and be noticed by target users has become extremely important. In this context, TV people's livelihood news is also actively rewriting the news production and broadcasting mechanism of traditional media. They have imitated the trump livelihood programs with successful communication effects, copied their news types, host styles, and broadcast time, and actively sought innovative ways, but also brought many new problems.

4. Results and Analysis

Facing the current situation of changing the communication mode of TV people's livelihood news, we should learn about the publicity and improvement of media marketing. Traditional enterprises rely on newspapers, radio, and television to carry out commodity publicity. When new media rise, it has changed quietly. A large number of enterprises have gradually reduced their original advertising investment in television, radio, and paper media, and then occupied the Internet market. In the face of the current situation that its advertising sponsors turn to other media for marketing and publicity, on the premise of good quality of its own programs, the TV people's livelihood news program also tries to

attract other enterprises that need advertising and publicity to invest and sponsor according to the competitiveness of its own programs, strive for local enterprise advertising resources, and do a good job in offline audience interactive experience activities to enhance the vitality of the program so that viewers who pay attention to the program can be closer to the program, and it is also convenient for potential advertisers to observe and think. In this way, it also alleviates the dilemma of the lack of sponsored advertisers for the livelihood news programs on the ground channel to a certain extent. In addition to the offline activities to promote advertisers, the team members of the TV people's livelihood program group can also plan the online sponsor product exhibition and marketing, relying on the column's own brand influence to market the sponsor advertising products on the network, so as to achieve the virtual environment profit model of advertisers for market publicity.

When the communication mode of traditional media is facing the process of integration with new media, the traditional concept should also be updated in time. The current TV content supply platform transmits more different types of fresh TV news information to the audience. Under the new media pattern with Internet terminals, the traditional media should realize that the content released by themselves will be given to the audience through different media, and today's TV audience has also transitioned from the traditional TV audience to the all media user. This also determines that the information based on the content platform can be spread to more users through more diversified communication channels such as websites, publications, and radio.

In the face of TV livelihood news programs under the condition of industrial chain, we need to appropriately adjust the structure of our own programs, screen the "gold content" of program content, and pay more attention to the "big news" of people's livelihood. Find typical news from "small stories" and dig more in-depth reports of news. When a variety of media methods compete for the attention of audience users, the perspective and depth of news reporting determine the position of TV people's livelihood news in competition with other media. If we care about each other with the content on the new media platform, TV Minsheng news will be truly recognized by the audience with its own depth and reporting rigor. However, if the audience wants to get fresh first-hand news information, new media has become the best choice because of its faster communication speed. News websites on the Internet, mobile app news clients, and news on micro-blog and WeChat are transmitting the content of news information from their own perspectives. Therefore, facing the traditional TV news media in the multi-angle industrial chain, people should adapt to their respective advantages and their own positioning in the integrated media environment and strengthen their own livelihood perspective news. Even in the integration process, they cannot blindly cater to the communication mode of new media. If the traditional TV media loses its own news attribute in the integration process, it will eventually be "shuffled" and eliminated in the process of media reform. Therefore, in the process of

integration, we should learn the complementary advantages of media and learn to explore new ways of reporting in a timely manner. Under the new normal Internet plus media era, we will try to find a new look of TV news about people's livelihood in the background of new media convergence.

At present, the columns of TV people's livelihood news basically meet the needs of middle-aged and elderly audiences, such as life services, daily conversation, and curiosity. This is because practitioners believe that local middle-aged and elderly TV viewers mainly watch livelihood news. In the fixed demographic dividend, the inherent personality endorsement has been formed. The result of this vicious circle is that while it cannot attract new audiences, it will lose the fixed audience transferred to other new media due to fatigue and curiosity at any time. Such a development has a devastating impact on TV people's livelihood news. To enhance the vitality of people's livelihood news in the media era and attract young audiences from different groups is the only way out for TV people's livelihood news. The way for young people to receive news is mainly through the Internet and mobile terminals. Therefore, cultivating young audiences is also the only way for TV media to develop financial media communication.

To cultivate young audiences, we must first rebuild the vitality of people's livelihood news. Use professional news to record the most important things around local people. In terms of news content, we should strictly screen news topics with social value and application value. Meet the needs and habits of young people, such as employment information suitable for college students, housing information suitable for young people entering the workplace, and parenting information suitable for young mothers. In terms of communication voice, news language should be more fashionable and interesting.

5. Conclusion

Speed up the combination of TV people's livelihood news and financial media, and establish all-round employees in the workflow. Journalists should have all-round media ability and high ideological and cultural literacy, and master the live broadcasting process of traditional media and the use of mobile media equipment. Everyone in the team has the ability to skillfully use multiple media. After getting the livelihood news, the collected content can be transmitted to different broadcasting platforms such as TV, network, and mobile terminal as soon as possible, and presented to the audience in different ways such as text, picture, video, and audio. All media editors can not only give full play to their own expertise to complete the new media editing work alone, but also flow across posts and give full play to their post-responsibilities in the overall operation. With good teamwork spirit, media integration awareness, innovative spirit, and professional quality, it is a necessary quality for "one specialty and multiple abilities" all media editing talents. Through the data analysis of "Watch The City" and "Fujian Daily," it is proved that it is very important to understand and solve the problem of

news communication innovation in the financial media environment. It can effectively solve the problem of insufficient application of emerging media technology to news communication, meet people's demand for the emerging of news communication, make up for the insufficient application of emerging media technology to news communication, and improve people's attention to news.

Data Availability

The labeled data set used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

The Function Mechanism of the Current Situation of Chinese Cultural Integration and Environment on the Development of Chinese Enterprises

Shuwen Zhang (ID)

Law School and Intellectual Property School, Jinan University, Guangzhou 510632, China

Correspondence should be addressed to Shuwen Zhang; zhangshuwen@jnu.edu.cn

China's economy is booming and many Chinese enterprises are growing rapidly. The report card handed over by Chinese enterprises through practical actions proves that Chinese outstanding entrepreneurs have successful modern management experience. These Chinese entrepreneurs have experienced the test of practice, and the experience gained has Chinese characteristics and is worth promoting. Entrepreneurs carry out more business management practices, which also provides valuable reference resources for the study of Chinese management thought. At the same time, *The Times* is also calling for more Chinese entrepreneurs to form their own management ideas. The influence of the current situation of the Chinese cultural integration environment on the development of Chinese enterprises is mainly that a good cultural integration environment will promote the development of enterprises and provide preconditions for the development of Chinese enterprises. This paper studies the current situation of Chinese culture integration environment of Chinese entrepreneur management thought formation process; the main purpose is, through the analysis of Chinese outstanding entrepreneur management thought formation process, to reveal the Chinese culture integration management environment formation law and essential characteristics, in order to enrich the management cognitive research and Chinese entrepreneurs management thought research, publicity, and promotion of Chinese outstanding entrepreneurs form management thought and also to provide a reference for more practitioners.

1. Introduction

The Chinese nation is a nation with strong cohesion and centripetal force. This cohesion and centripetal force largely stems from the Chinese nation's high recognition of Chinese culture. In recent years, the economic strength of overseas Chinese has continued to grow, and Chinese enterprises have changed from labor-intensive to capital- and technology-intensive. The contribution of overseas Chinese to China's economic development has also been continuously affirmed and emphasized. The thesis aims to explore the development of overseas Chinese culture in Chinese enterprises. First of all, we need to interpret these two terms: Chinese refers to former Chinese citizens and their descendants of foreign nationality [1], who have joined the nationality of other countries; overseas Chinese refers to Chinese citizens residing abroad who have Chinese nationality [1]. Overseas Chinese culture is a complex combination of traditional agricultural civilization and rationalist cultural spirit dominated by modern industrial civilization [2]. It includes both traditional agricultural civilization and rationalist cultural spirit dominated by modern industrial civilization. After World War II, the society of overseas Chinese has changed, which is also the most far-reaching change in the history of overseas Chinese. More than 90% of overseas Chinese have joined local nationality and slowly integrated into the local environment politically, economically, and culturally. At the same time, it also brought Chinese culture to the local area. Chinese culture began to change slowly, and overseas Chinese culture gradually formed. The gradual commercialization of overseas Chinese culture, coupled with the local socioeconomic

and political recognition from overseas Chinese to overseas Chinese, has undoubtedly accelerated the localization process of overseas Chinese [3]. The so-called overseas Chinese culture is essentially a Chinese culture transplanted overseas and preserved among overseas Chinese, which belongs to "overseas Chinese culture." In today's social, economic, and cultural context, it can be found that overseas Chinese going abroad is different from the colonialism of Western countries under the protection of power, but peaceful and civilized immigration with working people as the main body. The overseas Chinese culture is relatively independent, highlighting the spirit of Chinese enterprises.. At the same time, it is also the product of the combination of Chinese and Western cultures. It has not been assimilated into the development process of the world but can develop and innovate in the torrent of economic exchanges and cultural torrents, maintain a free development method, and become a driving force. The driving force for the further development and self-improvement of the overseas Chinese culture, thus spawning a group of overseas Chinese with a higher level of knowledge and strong adaptability, making contributions in the fields of economy, culture, science, and technology. Development opportunities for Chinese Enterprises: "the Belt and Road" International Cooperation Summit Forum. The opening of the forum at the Beijing National Convention Center has attracted the attention of overseas Chinese all over the world and also made overseas Chinese in other countries feel the opportunities and honors of the motherland. After the efforts and accumulation of several generations of overseas Chinese, batches of overseas Chinese businessmen with strong capital strength and economic resources have seen new opportunities for career development and life under the "Belt and Road" initiative by virtue of their unique advantages of "connecting China and foreign countries." The interactive relationship between Chinese enterprises and overseas Chinese is conducive to the implementation of the "Belt and Road" initiative and jointly promotes the economic cooperation between my country and the countries along the "Belt and Road." Simultaneously, from the existing research results, there are many definitions of the corporate culture. Although there are differences in views and expressions, there is also a basic consensus that the core of corporate culture is set as values or related expressions (see Table 1).

2. Cultural Characteristics of Overseas Chinese

As shown in Figure 1, in today's socioeconomic and cultural context, it can be found that overseas Chinese going abroad is different from the colonization protected by power in western countries, but a peaceful and civilized immigrant with working people as the main body [4]. The overseas Chinese culture has relative independence, highlighting the gap between Chinese and Western cultures. At the same time, it is also the product of the integration of Chinese and Western cultures, which has not been assimilated into the development process of the world. On the contrary, it can develop and innovate in the torrent of economic exchanges and culture, maintain a free development mode, and become

the driving force to promote the further development and self-improvement of overseas Chinese culture, so as to derive a group of overseas Chinese with high knowledge level and strong adaptability and make contributions in the fields of economy, culture, science, and technology [5].

Diversified cultural attributes maintain the original fine traditions of the Chinese nation and quickly absorb the advantages and specialties of other national cultures, so as to enrich and improve their own ability [6].

Overseas Chinese culture is the result of the large-scale overseas migration of Chinese people in modern times, the preservation of broad and profound Chinese culture, and the continuous absorption of the essence of western culture [7]. It has become the product of the exchange and integration of Chinese and Western cultures. Due to the differences in the economy and culture of foreign countries, it is very challenging to be familiar with their economy and culture [8]. Therefore, overseas Chinese must constantly update and change, keep pace with the development of other countries, and, at the same time, organically combine the original unique culture of the Chinese nation with the local culture, so as to make the change trend of the traditional culture of overseas Chinese and the inheritance trend of the traditional culture of overseas Chinese go hand in hand, so as to make them integrate and develop together and maintain the freshness, vitality, and creativity of the overseas Chinese culture [9].

Overseas Chinese culture reflects the humanistic spirit and embodies the noble national spirit and national integrity that inspire contemporary and future generations to work hard and love their country. Chinese traditional culture is impacted by western culture. The new lifestyle and new culture imperceptibly absorb new cultural factors and accept new lifestyles in constant contact, exchange, friction, and conflict so that overseas Chinese can gradually establish the concept of self-confidence and openness and have an all-inclusive attitude. The particularity of historical evolution endows overseas Chinese culture with strong vitality that is good at absorbing the advantages and specialties of other national cultures [10].

3. The Development and Reform of Overseas Chinese Culture

The formation and development of overseas Chinese culture is not a process of Westernization. As an ancient civilization with a long history in the world, China has a unique traditional culture [11]. The tradition of "falling leaves and returning to their roots" has not been forgotten and replaced in the development of overseas Chinese culture [12]. Overseas Chinese have formed a culture of constant struggle for self-improvement, retained the traditional virtues of the Chinese nation of hard work and self-reliance, and excavated a strong personality of independent exploration [13]. Overseas Chinese has gradually made remarkable achievements in the economy. The continuous development and reform of overseas Chinese culture has gradually improved the social status of overseas Chinese in foreign countries, made overseas Chinese living in foreign countries more

TABLE 1: Definition of corporate culture.

Scholars	Definition of corporate culture
Hofstede	The mental process of an organization
Deere and Kennedy	The main values that the organization believes in
Peters and Waterman	The values that all employees abide by together, that is, the rules of conduct that are acceptable to all
Dennison	Value, belief, and behavior pattern, the core identity of an organization
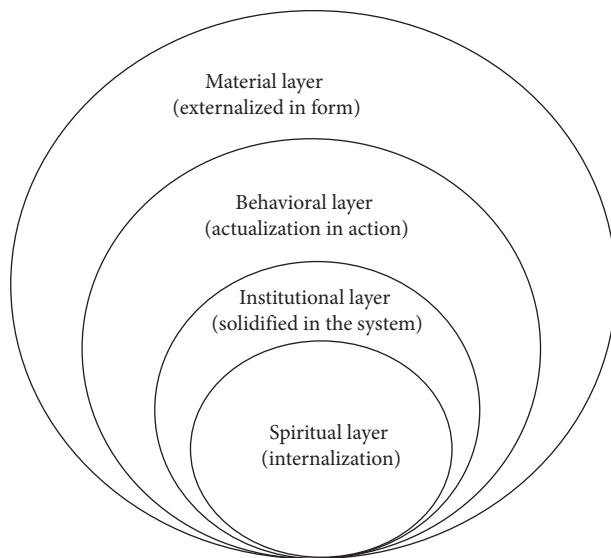
FIGURE 1: Four-level structure model of overseas Chinese culture.

confident and have more voice, driven the healthy and benign development of China's relations with other countries, and connected the development of Chinese enterprises in other countries [14].

Chinese traditional culture itself has the temperament of being implicit, introverted, restrained, and reserved. Confucianism teaches people to learn self-discipline, restrain selfish desires, and abide by etiquette and moral norms. In contrast, most Latin American countries belong to a typical indulgent culture. The contempt for labor and the devaluation of wealth in Catholic ethics may be one of the reasons for this phenomenon. Catholicism opposes people's excessive pursuit of material wealth and condemns those who are greedy for wealth. At the same time, it believes that the purpose of labor is to survive and self-sufficiency and encourages people to be content. The direct reflection of this concept of wealth and labor in today's Latin American society is that compared with work, people pay more attention to leisure and entertainment and have a more casual and relaxed lifestyle and a higher degree of happiness [15].

The integration of immigrants is affected by many factors. This part will use the theory of cultural dimension to analyze the advantages and obstacles of overseas Chinese in the process of integrating into local society from the perspective of cultural values. It should be made clear that Chinese, overseas Chinese, and ethnic Chinese belong to different concepts [16]. Although Chinese immigrants, especially the third generation immigrants, have Chinese descent, they have been partially or completely localized in terms of language, habits, lifestyle, and values, so they have a

high degree of social integration. The research object of this paper is mainly the overseas Chinese who were born in China and have lived in China or the second-generation immigrants who were born in the country of residence but have a strong sense of Chinese cultural identity [17].

Both foreign countries' sense of identity with Chinese immigrants and Chinese immigrants' sense of identity with the country of residence are at a relatively low level. Although as an immigrant country, it is the basic national policy of all countries to absorb immigrants, the loose immigration policy is mainly aimed at European immigrants and Asian immigrants, including Chinese, have been discriminated, and excluded to varying degrees for a long time. From the end of the nineteenth century to the first half of the twentieth century, many countries have set off a wave of anti-Chinese many times. After the 1990s, with the rise of China's national strength, the attitude of various countries towards overseas Chinese has also undergone positive changes, and the contribution of overseas Chinese has been more affirmed. However, the stereotype of the status of European and American Chinese as the center of history and culture still exists. Argentine scholars have analyzed the reports on immigration issues published by the two mainstream media with the largest circulation in the country, the national newspaper, and the horn newspaper, from 1999 to 2005. Research shows that when talking about "foreigners in Argentina," only Latin Americans and Chinese are called "immigrants," while Europeans and Americans are called "executives," "professionals," or "entrepreneurs" [18]. This example shows that the Argentine Society does not treat immigrants from different countries equally. "Immigration" specifically refers to people seeking job opportunities and social promotion, which is derogatory, while groups from European and American countries do not belong to "immigration" because they maintain their original economic and social status [19].

In a society with high uncertainty avoidance, people regard "different things are dangerous," so they have strong racial prejudice and xenophobia and are more hostile to foreign immigrants. The nationalist tendencies and prejudice against the Chinese in many countries can partially verify this judgment. On the contrary, Chinese immigrants also harbor cultural nationalism, have a strong cultural and emotional identity with China, have a "guest" mentality towards the country of residence, and are used to using "we" and "they" to distinguish their peers and locals. At the same time, they also have a certain prejudice against blacks and Indians in the country of residence. Nowadays, China's food culture, festival customs, traditional Chinese medicine, and Chinese have been widely spread in various countries through the media and bridge of overseas Chinese, attracting

the attention and love of more and more people in various countries. Most overseas Chinese have also accepted the local cultural traditions, and the mutual recognition between the two sides has gradually improved [20].

Collectivism culture has two typical manifestations among Chinese and overseas Chinese. First, the family business model is very common. Family ties and acquaintances have played an extremely important role in the process of Chinese immigration. The strong sense of family responsibility not only makes "chain migration" the main migration path of the Chinese but also gives the Chinese economy a strong clan color. When choosing partners or employees, family members and fellow countrymen are given priority. Second, Chinese groups have the strength to seek unity and mutual assistance. Since the late nineteenth century, overseas Chinese in Latin America have established overseas Chinese organizations. Nowadays, all countries have overseas Chinese groups and associations with different numbers, functions, and sizes.

The influence of collectivism also has two sides. On the one hand, both family business and mutual assistance, as well as immigration organizations, help the Chinese to stay together and cope with various difficulties in the process of cultural adaptation. On the other hand, too much emphasis on and reliance on collectivism may also lead to the formation of strong cohesion within the group, resulting in exclusion as "outsiders" by other groups. This relative closeness is manifested in the lack of contact between overseas Chinese groups, their own policies, and even the phenomenon of disunity and exclusion. The external performance is that the Chinese social circle is narrow and single, is limited to the Chinese community, and lacks contact with local people. When studying the new Chinese immigrants in Chiapas, Mexico, domestic scholars found a case in which they can better integrate into the local society after cutting off the connection with the Chinese community. Although this case is not universal, it also proves the importance of the Chinese surpassing and breaking through the original circle of friends, reducing their dependence on each other, and expanding and diversifying their social networks for social integration.

Collectivism has promoted employees to take on a new look, always adhere to strict management, strengthen assessment and accountability, regularly organize and carry out special inspections of discipline style, effectively solve the problems of work procrastination, buck-passing, and out of shape implementation, promote the further reversal of work style, and constantly revise and improve the code of conduct for employees (as shown in Figure 2) according to the actual development of the enterprise.

4. Evolution of Overseas Chinese Culture to Chinese Enterprises

In recent years, overseas Chinese have begun to pay extensive attention to political activities, and various types of overseas Chinese associations and organizations have sprung up all over the world. Overseas Chinese have gradually occupied a seat in the political arena of their country and have a certain voice, marking the further improvement of the social status of overseas Chinese. Before the 1970s, the social development trend of overseas Chinese generally showed the trend from falling leaves and returning to roots (overseas Chinese) to taking root (overseas Chinese)—integrating into local society (assimilating into local people), with the characteristics of rapid development and large scale (as shown in Table 2).

4.1. The Rise of Chinese Enterprises. With the continuous improvement and consolidation of the status of overseas Chinese in the political and economic fields, overseas Chinese have made remarkable economic achievements, resulting in the emergence of a large number of enterprise groups, which have become an integral part of the local economy. For overseas Chinese who have lived abroad for a long time, they often pay attention to returning to their roots when they are old, living in their hometown, or running enterprises, resulting in a cultural collision and new forms. Since World War II, overseas Chinese culture has undergone a qualitative change, and overseas Chinese culture has been gradually replaced by a new type of Chinese culture. People can see that although most Chinese have joined the local nationality, the code of conduct and values retained from their bones cannot be changed overnight. The traditional overseas Chinese culture has lost its fertile soil of existence by settling abroad from China. Overseas Chinese travel abroad. In addition, the local government does not allow the transplantation and dissemination of culture for the purpose of allegiance to China. Some governments even adopt the policy of forced assimilation to try to eliminate the Chinese culture and completely localize the Chinese culture. This trend makes the overseas Chinese in foreign countries self-improvement. Thus, some seeds have quietly changed in the Chinese mentality, making them change from "falling leaves and returning to roots" to "taking root."

4.2. The Relationship between the Development Opportunity of Chinese Enterprises and the Construction of Enterprise Culture. The "One Belt, One Road" International Cooperation summit opened at the Beijing National Convention Center, which has attracted close attention from overseas Chinese and the overseas Chinese of other countries. One belt, one road has been seen by many overseas Chinese businessmen who have strong capital strength and economic resources. They have seen the new opportunities and new changes in their life under the initiative of "one belt and one road." Since then, overseas Chinese have become a bridge and link connecting the economy and trade between China and other countries, which is strong support and guarantee for Chinese enterprises to "go global." One belt, one road initiative will help one belt, one road, and one country along the road. Chinese culture and corporate culture are both organically unified and can be mutually constructed and integrated. According to the four-level structure theory of corporate culture, we can make efforts from the four aspects of spiritual level, institutional level, behavioral level, and
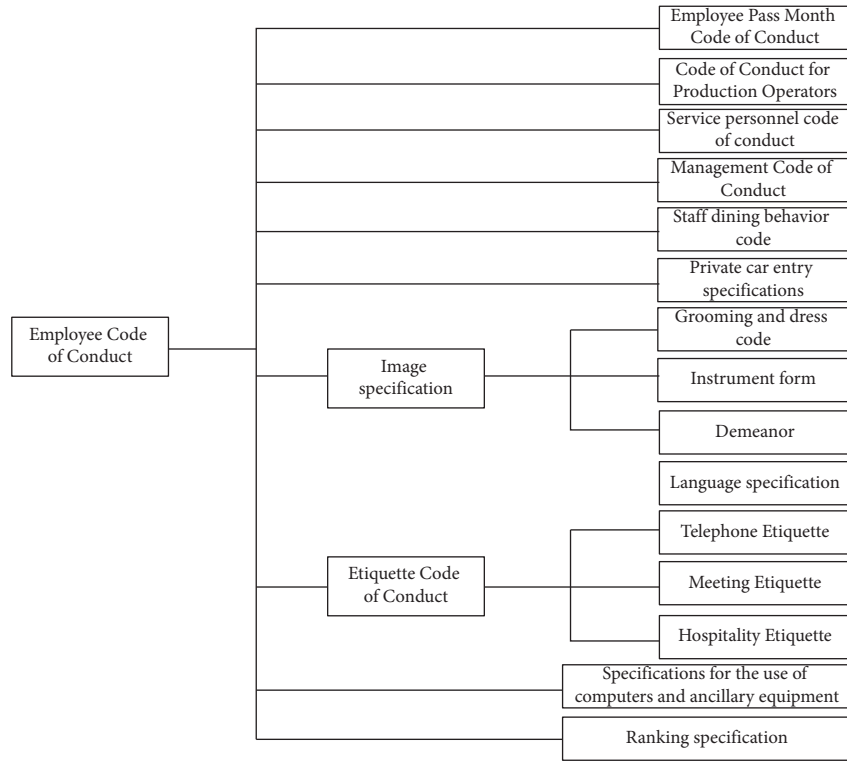
Figure 2: Employee code of conduct.

Table 2: Seven Chinese rich in Forbes 2013 Thailand's top 10 rich list.

Rank	Name/family	Net assets	The main group company
1	Dhanin Chearavanont and his family (Dhanin Chearavanont and family)	126	Bobi group
2	Zheng Youying family (Chirathivat family)	123	Central group
Central Group3	Su Xuming (Charoen Sirivadhanabhakdi)	106	TCC group
4	Xu Shubiao family (Yoovidhya family)	78	Red Bull Thailand Company
5	Li Zhizheng	39	Dacheng Bank
8	Xu Hanguang and his family (Vichai Maleenont and family; Krit Ratanarak)	20	BEC World Group
10	Thaksin Sinawatra and his family (Thaksin Shinawatra and family)	17	Qinnayue Computer Telecom Group

material level to promote Chinese culture and corporate culture as mutual means, driving force, bond, and service for each other. Through concept guidance, system integration, behavior orientation and image building continuously promote the smooth realization of the production and operation objectives of the enterprise (as shown in Figure 3), comprehensively shape and improve the corporate culture, and form a cultural system including ideas (as shown in Table 3).

4.3. Attach Importance to the Education of Overseas Chinese Culture.

The development of the country and economy is inseparable from culture, which is also proved by the continuous development of overseas Chinese culture. Overseas Chinese cultural education not only can provide opportunities for overseas Chinese to learn their own
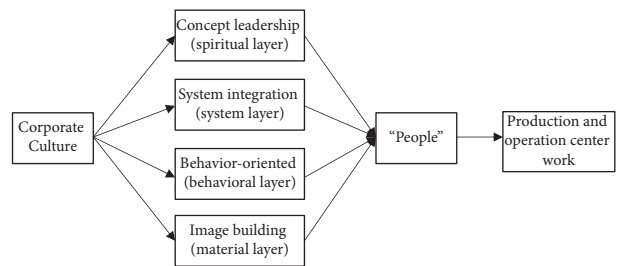
Figure 3: Mutual construction and integration of Chinese culture and corporate culture.

language and inherit the traditional culture of the Chinese nation but also can spread the Chinese language—Chinese on the world stage, making Chinese a bridge and messenger for the exchange and integration of Chinese culture and the language and culture of all nationalities in the world and

TABLE 3: Corporate philosophy and culture system.

Enterprise vision	First-class production enterprises in China
Enterprise philosophy	Be sincere in believe and be far away
Enterprise strategy	Expand the brand and strengthen the enterprise
Entrepreneurship spirit	Pragmatic innovation passion surpasses
Enterprise style	Strict, fine, and solid
Talent concept	Cultivate the position of cultivating talents, compete, and choose talents
Learning idea	Learn ability + innovation ability = competitiveness
Concept of quality and safety environment	Strive for perfection, pursue perfection, provide high-quality service, create satisfaction, comply with the law, be safe, optimize the environment, strive for continuous improvement

playing a positive role in promoting the development process of Chinese enterprises. The exchange and integration of languages and cultures between different countries and nationalities, learning from each other's strong points to complement each other's weaknesses, and coexistence for common prosperity are not only problems at the cultural level, but also an important factor affecting the peace and development of today's world. It is the overseas Chinese cultural education that helps overseas Chinese understand the essence of Chinese traditional culture through historical stories and timely, truly, objectively, and accurately convey the actual development status of our country, so as to arouse the sense of national cultural identity and mission of overseas Chinese and then guide overseas Chinese to actively participate in various construction of our country and promote the development of Chinese enterprises.

5. The Influence of Chinese Cultural Integration Environment on the Development of Chinese Enterprises

5.1. The Influence of Family-Based Thought on the Success of Chinese Enterprises. In the eyes of Chinese people, the family is a small society integrating production, consumption, education, insurance, and life. The family standard thought is the leading spirit of family ethics in Chinese traditional society. The family standard emphasizes the supremacy of family interests, blood relationship, and family harmony. It has a strong exclusiveness and emphasizes the sustainable and long-term development of the family. Throughout the development history of Chinese traditional ethics, the thought of family standards runs through all the time. China has a strong family-based thought, which is formed for two reasons: first, it is determined by the special social structure of ancient China, and second, in China's traditional small-scale peasant society based on self-sufficiency, there is a serious dependence on the family.

Family-based thought is closely related to the success of the Chinese. Most Chinese enterprises in the world are family enterprises. It is an enterprise established and developed on the basis of the family. In China, setting up enterprises and working hard for them are for the benefit of the whole family, for raising families with family property, and for passing on family property to future generations. Chinese people's property is more used for saving; the West is more willing to entrust enterprises to outsiders; and timely consumption is the motivation of enterprise development. In addition, in order to increase family assets and pursue maximum profits, the Chinese invest their funds in industries with high profits and withdraw from industries with low profits. In the West, the development of enterprises is for the development and growth of enterprises themselves.

Under the influence of the concept of family standard, although Chinese family enterprises occupy a place in the world and there are many world-class tycoons among Chinese, there are still some obstacles to their development. For example, it takes its own family members as managers, which makes it difficult for Chinese family enterprises to embark on institutionalized management. It implements the property distribution system of the combination of unification and division, not the eldest son inheritance system, which makes the equity responsibility of the enterprise unclear. For these obstacles, Chinese family enterprises need to optimize the management system, absorb the management elite into the management, and constantly learn and adapt to the marketing model of cross-cultural management (as shown in Figure 4).

5.2. The Influence of Chinese Traditional Philosophy of Emphasizing Agriculture and Restraining Business on the Success of Chinese Enterprises. The conceptual organization is conducive to managers' correct analysis and decision-making in the management process by virtue of the organization type structure and the characteristics of high dependence on knowledge and ability (as shown in Figure 5).

In addition, China's traditional philosophy of emphasizing agriculture and restraining business also has a great impact on the success of Chinese enterprises. In ancient times, businessmen were rarely encouraged by the government, and their capital was almost evenly distributed. Therefore, many household products were consumed by themselves. The policy of emphasizing agriculture and restraining commerce was formed in the pre-Qin period. Mencius and Legalists of Confucianism put forward such an idea. It developed in the Qin and Han dynasties. Shang Yang's reform opened the precedent for its development. The policy of emphasizing agriculture and restraining business is the reflection of the natural economy and the inevitable product of the low level of social productivity. The essence of the policy of emphasizing agriculture and restraining commerce is to safeguard the feudal economic foundation, safeguard the interests of the landlord class, and consolidate their own rule. Although this policy has
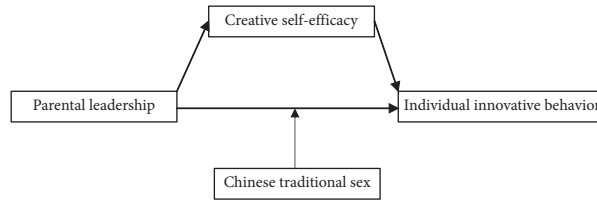
FIGURE 4: Mutual construction and integration of Chinese culture and corporate culture.

FIGURE 5: Cultural integration model.

promoted the prosperity and development of the agricultural economy to a certain extent, mobilized the enthusiasm of farmers, and is conducive to the prosperity and development of the economy, it has also brought many negative effects. For example, this policy has restrained the development of the commercial economy, made enterprises only stay within the family, and laid a foundation for Chinese family enterprises to expand their relations from within their own family, which cannot surpass the family and establish a modern enterprise management model. In addition, this policy also makes the development of Chinese enterprises lack the spirit of constitutionalism. Even if it makes Chinese enterprises based on development in the world, it also brings many problems, such as the management system and model cannot keep pace with the times.

In short, the family system with the profound historical origin and cultural precipitation is the foundation of supporting Chinese society and has a profound impact on China's development for thousands of years. The ethical concept of family standard based on a self-sufficient family society, the traditional philosophical thought of emphasizing agriculture and restraining business, and the traditional thought of "being an official and making money" all play a positive role in the development of Chinese enterprises.

6. Conclusion

First of all, values are the deepest expression of culture, and cultural differences have many forms of expression. In many cases, people see its external side. Secondly, different races, religions, genders, generations, and classes have different cultural characteristics, which only reflect part of the national (regional) cultural dimension, not all. Thirdly, the correlation between cultural dimensions is different in different countries (regions), which leads to obvious differences in the specific practical activities of countries (regions) close to one dimension due to the different influences of other dimensions. The influence of cultural values on the social integration environment of overseas Chinese is the focus of this paper. As for other influencing factors, such as the immigration environment and immigration policy of the country where the overseas Chinese live, the cultural literacy and social background of the overseas Chinese, and how the overseas Chinese overcome the obstacles and realize cross-cultural adaptation, it needs to be further studied in the future. On the whole, the cultural differences between China and Latin America have caused great obstacles to the cultural adaptation and social integration of the Chinese. This is the same dilemma faced by immigrant groups around the world. However, in some cases, cultural differences are not necessarily a bad thing. For example, the degree of the economic integration of Chinese in Latin America is relatively high. In any case, the integration of immigrants is a long process, and cultural values are an important influencing factor.

The degree of social integration of immigrants is affected by many factors. Western scholars pay more attention to explaining the discrimination, exclusion, or restriction of immigrants in the host country from the perspective of objective conditions such as system, human capital, and social capital, which is mainly based on people's cognition of the poor integration of immigrants in the inflow place. The ultimate

purpose of the study is to promote countries to formulate policies conducive to the integration of migrants, so as to improve and improve the integration of migrants. However, it is obvious that the social integration of immigrants is also affected by the differences between their own culture and the culture of the country where they live, and this influence runs through the whole process and all stages of social integration, with far-reaching and lasting characteristics. When studying the social integration of Chinese and overseas Chinese, domestic scholars generally believe that the cultural differences between China and foreign countries and the resulting embarrassment of cross-cultural communication are the biggest obstacle for Chinese immigrants to integrate into local society. For example, when studying the social integration of Chinese in Australia, some scholars believe that "cultural differences are doomed that Chinese cannot be fully assimilated by Australian society." When studying the social integration of Chinese in South Africa, some scholars believe that "cultural differences and utilitarian "passers-by" adaptation strategies have affected the long-term development of new Chinese immigrants in South Africa to a certain extent." It can be seen that culture is a very important factor in the social integration of overseas Chinese.

If the overseas Chinese culture has experienced the whole process of collision, identification, assimilation, selection, and innovation, then the traditional overseas Chinese culture has experienced the process of collision, identification, and assimilation. Wang Kangmei believes that if Chinese culture has experienced the whole process of collision, identification, assimilation, selection, and innovation, then Chinese enterprises have also experienced corresponding development, which is consistent with the point of view in the article. There is an old Chinese saying that "the kindness of a drop of water should be rewarded by a spring." In the process of continuous self-charging and self-strengthening, overseas Chinese have not forgotten the root but continuously strengthened and deepened the Chinese civilization and Chinese spirit on the global stage. Many years ago, many Italians had to sell their business to the Chinese because of business difficulties. Now, the Chinese not only use their wisdom and diligence to carry forward their business step by step but also give back to the country with a grateful heart. This is a good phenomenon. It shows that the strength of the motherland has affected overseas, the national self-confidence has been greatly strengthened, and the cultural self-esteem has been improved. The return of Chinese enterprises illustrates that the essence of Chinese culture has gone deep into the hearts of every Chinese people. The development of overseas Chinese culture to Chinese enterprises enables other countries in the world to better understand, know, yearn for, and feel China.

Data Availability

The labeled data set used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

An Exploration of the Differences between Chinese and Western Costumes in the Archaeological Archaeology of Clothing Culture in Different Periods of Agriculture

Jiwen Zhang [iD]

School of New Media Art, Xi'an Polytechnic University, Xi'an 710048, China

Correspondence should be addressed to Jiwen Zhang; 20030752@xpu.edu.cn

Countries around the world have different historical development processes in different periods of agricultural economic environment, and have formed different costume culture characteristics. This study analyzes the differences in aesthetic standards in Chinese and Western clothing cultures, as well as the differences between Chinese and Western costumes in color design, structural design, and dress methods, and elaborates the main reasons for the differences between Chinese and Western clothing cultures. The study focuses on the characteristics and differences of traditional clothing art culture in various places, but because of the differences in historical conditions, lifestyles, psychological qualities, and traditional ideas and cultural concepts, there are great differences between the traditional costume art culture concepts in China and the West. Based on this, the study specifically explains the difference between the two through the comparison of the aesthetic characteristics of the traditional costume art culture concepts in the Middle East and the West, and the difference in the expression of the Middle East and Western clothing art.

1. Introduction

China's costume culture can be traced back to 5,000 years ago, and each dynasty and historical period is full of distinctive characteristics. Traditional Chinese costumes are mainly Hanfu, Hufu, and flag costumes [1]. Western costume culture can be traced back to Mesopotamia and Egypt. The history is also very long. Because of different cultures, different histories, and different environments, the external manifestations of Western and Chinese clothing are also different, and they are all an indispensable part of the history of human clothing [2]. Clothing is like a mirror, which illuminates the different historical and cultural backgrounds and connotations of various countries and regions. The difference between Chinese and Western clothing has a certain relationship with the cultural differences between China and the West, and the cultural differences between Chinese and Western clothing are actually the products of the historical and cultural precipitation of different regions and different countries [3].

As a cultural form, clothing runs through the history of various periods in the East and the West. In the long process of human history, Chinese clothing and Western clothing have embarked on different development directions because of different aesthetic consciousnesses. However, in the long history of development, Eastern and Western clothing and clothing also have the convergence and integration of styles from time to time, and with the development of economic globalization, the trend of integration of Chinese and Western costume culture is also strengthening. While discussing the cultural differences between Chinese and Western costumes, we should also think about the importance of maintaining national characteristics under the impact of globalization. Therefore, it is of great significance to explore the differences between Chinese and Western costumes.

2. State of the Art

"Appearance" is an important part of nonverbal communication in intercultural communication [4]. People will

consciously or unconsciously spread a lot of information to the outside world through clothing, makeup, ornaments, and other things, and from different costumes, it reflects the different aesthetics of China and the West, but because of the different aesthetics of China and the West, the difference in clothing is determined.

So what is the difference between Chinese and Western aesthetics? From the perspective of traditional Chinese aesthetics, Chinese emphasizes the beauty and elegance, and embodies the unique outlook on life and aesthetics of life settling down, returning to the heart, experiencing all things, connecting with heaven and earth, integrating self and all things as one, and obtaining the soul' Chinese suitability [5]. Therefore, in terms of clothing Chinese love, a low-key and elegant feature, outstanding but not ostentatious, gorgeous but not gorgeous [6]. And Westerners due to the characteristics of the living environment near the sea, love a kind of innovation and personality, they advocate freedom and dreams, so in the choice of clothing also reflects their exaggerated, distinctive characteristics, often in the mix-and-match, hip hop, rock and roll, and even a peculiar Gothic style appears, but the daily clothing fully reflects their debauchery, more emphasis on the comfortable, simple and decent characteristics of clothing [7]. In addition, China and the West also hold different views on "beauty": many countries in the West generally do not deliberately comment on the natural appearance of others, even if they praise the natural beauty of others will make people very uncomfortable, but they tend to praise others' modified appearance, such as makeup, hairstyles, clothing, accessories, and so on [8]. This is because in the traditional Western aesthetic thought, artistic beauty and artificial beauty are regarded as higher realms than natural beauty, as Hegel clearly said in "Aesthetics": "We can definitely say that artistic beauty is higher than natural beauty." Because artistic beauty is produced and regenerated by the mind, the mind and its products are much higher than nature and its phenomena, and artistic beauty is much higher than natural beauty [9]. The Chinese is very different, Chinese generally believe that the natural beauty of "natural beauty" is more praiseworthy and flattering than the artificial beauty and decorative beauty after makeup, so when commenting on the appearance, Chinese like to evaluate a person's natural appearance, thinking that praising a person's natural beauty can make the other party happy and feel respected, so since ancient times, there is a kind of "clear water out of the hibiscus, natural to carve" saying. In addition, Chinese generally believe that plain face is more beautiful, is the beauty of "grass color remotely look close but nothing," and the most advocated plain face clothing, and Westerners' preferences are very different [10].

2.1. The Characteristics of Traditional Chinese Costumes and Cultural Concepts

(1) Be Good at Expressing the Subtlety of Form and Color

Hazy, hidden but not revealed, implied allegory, giving people an aesthetic feeling. This kind of subtlety is sometimes displayed through style, and sometimes it can also give people the beauty of overall harmony through modeling, layout, color, line, and other means.

(2) Pay Attention to fine Artistic Techniques and Craft Expression

A large number of embroidery, streamers, patterns, and other decorative techniques are used to express rich imagination and achieve realism with romantic atmosphere.

(3) Pay Attention to the Atmosphere Effect of Style and Stability

The overall coordination of clothing gives people a sense of order and harmony and beauty, serious and solemn, beautiful and elegant, can play a role in foiling, clothing culture and environment to match, more distinct atmosphere of the times.

(4) Pay Attention to the Nationality of Clothing Culture

Costume culture is one of the important symbols of a nation's personality and national characteristics. As a folk phenomenon, clothing has a distinct national character. Long-term exchanges between different ethnic groups, Clothing cultures influence and infiltrate each other, and even intentionally borrow and imitate. But the Chinese nation has its own aesthetic tastes, ethics and cultural concepts, so it has its own dress code.

2.2. The Characteristics of the Cultural Concept of Western Clothing

(1) Advocate human body beauty

From ancient Greek times to the present, Western art, including clothing, often regards the praise of praise and the display of the natural beauty of the human body as supreme models. As a result, clothing has become a "by-product" on Westerners: women show the beauty of their bodies by exposing or hanging silk, while men show the health and strength of their skin more nakedly.

(2) Clothing is to attract the attention of the opposite sex to themselves Western clothing through the human body curves and some sensitive parts of the nudity treatment, to maximize the attractiveness of clothing, to give people an indescribable sense of beauty, in order to produce.

Psychological effects make people quickly enter the pure aesthetic realm.

(3) Highlight personality

Westerners dress heavily on self-expression and the pursuit of individuality. Seeking a breakthrough in balance and one-sided excavation, self-design, self-expression, self-creation and unique; through dress, fully indicate the ideal realm of the self and various concepts, show self-worth, so as to mark the self.

(4) Pursue sensory stimulation

Western clothing focuses on enabling the viewer to inspire sensuality and form unusual sensory stimuli.

Through careful design, unique color combination and special line segmentation, the design master fully reflects the psychological and physiological characteristics of gender. So, in the West, sexy clothing is the main factor defining the success of its brand designers.

3. Methodology

3.1. Archaeological Connotations of Knowledge. Michel Foucault proposed this method of analysis in The Archaeology of Knowledge. Knowledge archaeology refers to excavating like archaeology, deeply studying things that are unfamiliar to our cognition, and reinterpreting the things that we think we know [11]. Knowledge archaeology is different from the historical research we usually use, it is actually to abandon our existing, known things, to redig and explore, in the existing knowledge space to find those hidden in the depths of time of historical clues, in simple terms, knowledge archaeology is a kind of knowledge reunderstanding, is to restore the original appearance of things on the basis of its examination, screening, identification, search for its roots, is to open up the "known" in-depth study as shown in Figure 1 [12].

3.2. The Main Manifestations of the Similarities and Differences between Chinese and Western Clothing. In China's 5,000-year history, there is a rich and long history and culture, and there are great differences between traditional Chinese culture and the fast culture spread in the West, of course, there are similarities between them. Studying, "archaeology" the history of the development of Chinese and Western clothing, and observing the Chinese and Western clothing we see now, we can find that there are many differences and similarities between them from the aspect of clothing design alone. The similarities and differences between Chinese and Western costumes are inseparable from Chinese and Western cultures, because the differences between Chinese and Western cultures make their forms of expression different, and because the commonalities between Chinese and Western cultures make them similar. Culture is not good or bad, and there is no high or low clothing as shown in Figure 2 [13].

3.3. Differences in Clothing Colors. Color plays an immeasurable role in the aesthetics of clothing; it is an indispensable part of clothing, but also an indispensable part of people's lives. Studies have shown that people's sensitivity to clothing color is greater than people's sensitivity to the shape of clothing, so color has a very important position in clothing. People's most primitive instinct is to decorate clothing with color, which also shows the importance of color in clothing for people. "The color of Chinese clothing is more ethical, requiring clothing to maintain social order; the color of Western clothing is more emotional, and attaches importance to the regulation of people's psychology by clothing [14]."

FIGURE 1: The representative of oriental clothing—cheongsam.

FIGURE 2: Clothing styles in the middle ages in Europe.

This is because Chinese value the whole, while Westerners care about the individual. Chinese focus on the whole and ethics, while the West cares more about what the individual wants as shown in Tables 1 and 2. Therefore, the difference in the choice of clothing color can reflect the difference between Chinese and Western cultures [15].

In China's thousands of years of history and culture, it can be found that the choice and love of the color of Chinese clothing is inseparable from China's long-standing traditional culture. The preference of a nation or a country for color actually reflects the intrinsic culture of this nation and country. In ancient China, the color status of traditional clothing was influenced by the five elements of yin and yang, which defined the five colors of blue, red, black, white, and yellow as the five colors corresponding to gold, wood, water, fire, and earth, respectively, and promoted them as positive colors Other colors other than these five colors are derogatorily referred to as interchromatic [16]. In the early days of ancient China, people believed that black was the color that dominated all things, and it was the symbolic color of the gods, and history recorded that black was precious during the Qin Shi Huang period, and the clothes worn by Qin Shi Huang were mainly black. Red is also loved by many people in China, Chinese believe that red represents auspiciousness and festivity, and the walls of the Forbidden City are mostly

TABLE 1: Chinese clothing decoration overview.

Types	Jacket	Shirt	Coat	Robe	Vest
Quantity/piece	51	53	12	12	14
Form	Narrow long sleeves, long to abdomen; wide long sleeves or seven sleeves longer than buttocks	Narrow long sleeves, wide seven sleeves or long sleeves, as long as the abdomen or buttocks	Narrow long sleeves, short clothes, often only to the abdomen	9 men's robes, 3 cheongsam, narrow long sleeves	10 adult waistcoats and 4 children's waistcoats, 2 of which are draped
Collar type	No collar 2 pieces, vertical collar 49 pieces, collar height 3–8.5 cm	No collar 2 pieces, vertical collar 51 pieces collar height 3.5–7 cm	Stand collar, collar high 3.5–6. 5 cm	Vertical collar collar high: 4.5–6.5 cm	No collar 5 pieces, vertical collar, collar height: 3.5–7.5 cm
Door lapel form	32 right lapel, 18 left lapel, 1 right lapel	33 right lapels, 20 left lapels.	Opposite lapel	Right lapel	Right lapel 8 left lapel 1 opposite lapel 5
Sleeve type	Wide cuff width: 29–46 cm narrow cuff width: 14–18 cm	Wide cuff width 23–44 cm width of narrow sleeve: 12–18 cm	Cuff width: 15–25 cm	Cuff width 1 6–18 cm	Nothing
Decorative part	Lead edge, flap edge, sleeve edge, bottom pendulum, slit edge on both sides, edge insert, roll edge	Collar edge, flap edge, sleeve edge, bottom pendulum edge, roll edge decoration	Nothing	Women's cheongsam flap, collar edge, edge, men's robe undecorated	Flap, collar, edge, edge
Binding mode	A word buckle, disc buckle, hollowed out copper button	One word buckle, copper button, plastic button	One word buckle	One word buckle, gilded copper button	Disc buckle, one word buckle

TABLE 2: Western clothing decoration overview.

Species	Name	Quantity (piece)	Shape structure	Length (cm)	Waistline (cm)	Waist (cm)
Skirt	Horse skirt	47	On the basis of the traditional "apron" shape, with skirt door, pleated, beautiful dry, and so on, decoration, the skirt body is pleated on both sides, the middle part is the glossy surface, commonly known as the "horse face," often decorated with embroidery or inlay, roll, collage lace.	88–96	43–68	11–16
	Phoenix tail skirt	27	Because the shape and phoenix tail is similar to the name, into a strip narrow type, the lower end decorated with moire, such as Italy grain and other auspicious patterns, some tail decorated with tassel, bell and so on, seen in etiquette and marriage occasions to wear.	82–92	43–51	10–17
	Pleated skirt	11	The pleated skirt or ichthyosis skirt retains the basic shape of the horse skirt and is embellished on both sides of the "horse face" with rich, fine, and neat pleats.	90–95	56–64	12–15
Pant	Crotch pants	18	Wide crotch, set waist, waist fat, wear the extra part of the waist to the middle fold, with a cloth belt to hold tight, foot edge decoration.	92–113	47.5–60	18–20

red. According to historical records, the Jin Dynasty implemented the Jinde system, with red as the most expensive, so the Emperor of the Jin Dynasty wore red robes as shown in Figures 3 and 4 [17].

Chinese part of the admiration for yellow comes from the worship and reverence for nature in the early days of ancient China, and it is recorded in the Zhou Yi that yellow is the color of the central soil in the Five Elements Science, so in that period yellow was called zhengse, the most important color. The Chinese nation originated from the Yellow River region, the yellow land is the original habitat in ancient times, because yellow is the color of the earth, so people have a sense of reverence for yellow, but also because of the worship of the earth, gradually produced the idea of yellow as the respect. The other part was inextricably linked to the royal nobility during the feudal period. During the Sui Dynasty in ancient China, emperors began to wear yellow robes, and Tang Gaozu stipulated that "hundreds of officials and people are not allowed to wear yellow clothes," and yellow became the color used for the emperor, in addition to symbolizing that the Chinese dragon is also yellow. Chinese gave yellow a symbol of centralized power, and during the feudal imperial period, yellow was the color used by the royal court and was a representative of power. Because of this power effect, yellow has gradually become the most popular color of the Chinese nation [18].

The positive color was generally loved by the royal and high-ranking dignitaries, and slowly the positive color evolved into a symbol of power. It is not difficult to see that the choice of color in China's clothing has been influenced by China's traditional feudal etiquette culture, and positive color has gradually become the color that people love and
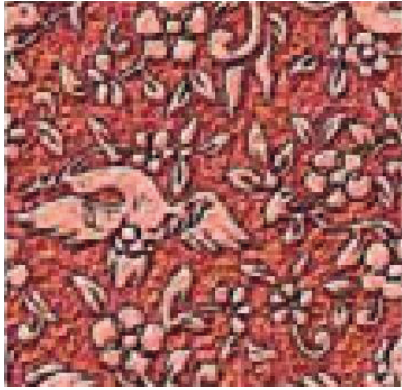
FIGURE 3: The subtlety of shape and color.

FIGURE 4: The unique artistic features of the east.

pursue in color matching. China's feudal hierarchy was strict, the royal aristocracy was extremely high, and the imperial power was supreme. We can clearly find from the color of clothing: any color that is favored by the royal nobility is forbidden to be used by the people, and if it is violated, it will lead to the disaster of killing. Conversely, if a color is abandoned by the royal family, then the color will also be regarded as a despicable color by the common people. To sum up, in ancient China, the choice of clothing color came from the submission to the feudal etiquette system, and the common people had a reverential and yearning heart for the right color [19].

In the West, Westerners' choice of color comes from individual emotions. They believe that color is the embodiment of emotions, they tend to make choices according to their own specific characteristics, they pay more attention to the individual, and most of them are not bound and agreed by the ruler in the choice of color. Westerners believe that color also has feelings, is the carrier of their emotions, just like the mirror of their own heart. In Roman times, white and purple were loved by Westerners. They believe that white is a symbol of purity and beauty, which cannot be defiled and violated, which is one of the reasons why until now Westerners generally choose holy white as the main color of wedding dresses [20].

It should be noted that purple, due to the complexity of the production of purple dye, purple is very scarce, usually only appearing in the rulers of the country and the royal family. Similar to ancient China, purple was only used for national rulers, symbolizing noble emperors, which was also a manifestation of a high degree of centralization. But this is not evident in the West as in China. During the Renaissance, due to the emergence of humanistic ideas, people's choice of color became more and more bold, and the variety of choices was also increasing. For example, in France, people like to decorate clothes with white, lilac purple, rose powder, and sky blue; in Spain, people worship gray and rose red; in Britain, black is sought after by the British, black is mysterious and noble in the eyes of the British, and black is sometimes chosen for formal occasions such as funerals. Westerners choose the color of clothing mainly related to their own collocation, preferences, and their hearts, sometimes they will use warm red to express their inner pleasure at that time, sometimes they choose black to attend important occasions to show their attention to it. Westerners choose color from within themselves, and unlike China, they are most often unconstrained by other conditions.

3.4. Differences in the Appearance of Clothing. Traditional Chinese clothing is more about visually highlighting the longitudinal effect, and designers usually use sagging lines to show the overall slender feeling. In traditional clothing, the barrel-shaped robe skirt is combined with the long sleeves that can cover the hands, and the design of the shoulder design is relatively subtle, not exaggerated, and does not pay attention to emphasizing the shoulder line. Traditional Chinese clothing forms used to be open in the form of plackets and plackets, which were mainly two styles. Traditional Chinese clothing usually adopts the two basic forms of tops and bottoms and clothes, which intersect in China's thousands of years of history and culture, are compatible and inclusive, and cover a wide range. Traditional Chinese costumes are more subtle and restrained than Western costumes; in fact, these forms of expression are inseparable from traditional Chinese culture. Chinese dressed in clothing to pay attention to subtle beauty, relatively conservative, very restrained expression of personality. Traditional Chinese costumes attach the same importance to the expression of imagery and care about artistic conception as the famous Chinese landscape paintings, just like the poem "Thousands of calls begin to come out, like a pipa half covered," traditional Chinese clothing pays attention to vague and subtle beauty. Although this kind of loose, unsuitable clothing cannot outline the human body lines and beautiful human contours, this kind of elegance that hides the curvy beauty of the human body is not a different kind of beauty.

Traditional Chinese clothing hides the human body and never exposes half of the skin. The clothing emphasizes loose, unsuitable, overlapping underwear outerwear, layer after layer like a lampshade covering the human body. Compared with Western clothing, traditional Chinese clothing is dull, bulky, and inconvenient. Westerners pay attention to human aesthetics, they dare to express themselves, dare to show their beauty, they are different and different, so Western clothing is more "bold and wild" compared with traditional Chinese clothing. Westerners

attach importance to the curved beauty of the human body, so Western clothing is mostly to highlight the curves and human body lines. The evolution of Western clothing styles began with the wrapped style in ancient Greece and ended with the wrapped unformed clothes and the semimolded clothes in the front opening type in the Middle Ages. Unlike traditional Chinese clothing, traditional Western-style clothing attaches importance to the visual sense of transverse in appearance. Traditional Western-style clothing often uses a horizontally expanding shoulder contour to achieve a visual lateral impact. Western designers like to use hard collars, inflated, and exaggerated sleeves to achieve the effect of radiating outwards.

Compared with traditional Chinese clothing, Western traditional clothing design is more open, exaggerated, and has ups and downs. Of course, not all Western-style clothing advocates tightness and revealing, and some Western-style clothing also pays attention to cover—Western traditional clothing also has wrapped styles. This kind of clothing is three-dimensional cut, emphasizing a close fit with the human body, in order to achieve the effect of outlining the perfect curve of the human body and fully highlighting the body shape of the human body. The shape of Western-style clothing, whether exposed or wrapped, is for one purpose—to highlight the human body line, pay attention to, and advocate the beauty of the human body. From a structural point of view, whether it is a robe, a shirt, a shirt, a gown, or a gown, there is usually only a structural line connecting the seam of the sleeve and the side hem. Traditional Chinese clothing adopts the traditional Chinese flat straight line cutting method, without shoulders and armholes, flat on the ground as smooth as paper, emphasizing the loose and comfortable dressing experience. Western clothing mostly uses three-dimensional tailoring methods to achieve the effect of matching the three-dimensional human body; this three-dimensional cutting method treats the human body as a three-dimensional polyhedron, using pleats and provincial processing and other clothing processing means, carefully considering the convex and convex, and undulating relationship of the human body from top to bottom, from front to back, which is a more humane cutting method. Traditional Chinese costume culture pays more attention to the expression of imagery, using the cutting method of flat lines and curves to make the clothes comfortable and not completely fit the body. Traditional Chinese clothing is not nude, not ostentatious, does not highlight the lines, and implicitly shows the smooth and gentle, warm, and flowing curved beauty of the human body in the vagueness of the covering. The modeling consciousness of traditional Chinese clothing is rhythmic, and the human body exudes a high-level line beauty between loose and unclothed clothes and walking, which is a subtle and intriguing beauty, which is different from the direct expression of the West. China's traditional clothing space modeling is expressed through the rhythm of "virtual and real" and "light and dark." Western clothing culture gradually sprouted the seed of spatial consciousness after the Middle Ages. This reflects the Westerners' search for space and their desire to occupy more space, so Westerners like to increase the volume of clothing, such as filling

clothes with items, and so on. They use clothing as a tool to expand and take up more space.

This exaggerated clothing shape keeps a certain distance between people and nature, between individuals and people, and between individuals and the whole. From the western people's clothing space modeling, it reflects the western people's cosmology, and also reflects the opposition between man and nature, mind and environment, subjectivity and objectivity. Due to the different philosophical and aesthetic concepts of the East and the West, different shapes are reflected in the clothing, and they also reflect completely different spiritual charm and cultural connotations. In traditional Chinese social and family education, clothing codes of conduct are regarded as one of the important contents of self-cultivation, which has long affected the Chinese people's hobbies and lives. Chinese pay more attention to the content of morality and ethics in terms of dress, and use clothing to cover up human beauty and not expose, so as to meet the moral requirements of Confucianism.

Traditional Chinese clothing pays attention to the beauty of people's spirit, temperament and charm, and does not emphasize highlighting the body but cares about the inside. Western clothing culture is diverse; it is all-encompassing, accepting all personalities. In summary, it is not difficult to see that under the influence of different cultures, the expression of clothing is different. The differences in style and appearance between Western and Oriental clothing are also closely related to the cultural background. Traditional Chinese feudalism, especially in women's clothing, is particularly evident. Western ideas are open, personality differences are prominent, and Westerners are innovative in the way they wear clothing and pursue individuality. Western culture is open and all-encompassing, and all "strange" things in the West are acceptable and accommodated, which is greatly reflected in the various costumes of the West. Western costumes take a variety of forms and are dazzling, such as the aristocratic Gothic style, the gorgeous Rococo style, the richly varied Romantic style, the gorgeous and subtle Victorian style, and so on. These exquisite and individualized Western costumes reflect the Pursuit of Individuality by Westerners.

3.5. Differences in Clothing Patterns. In the choice of patterns, Chinese and Western clothing also shows completely different and distinctive choices. In China, whether it is ancient or modern, whether it is aya silk or burlap, we can see patterns that symbolize auspiciousness. Chinese like to express their worship and admiration for totems by choosing patterns on the decoration. In China, patterns such as dragon and phoenix chengxiang, nine dragon play beads, and magpie dengmei are usually chosen to express the hope of a happy life. In China, we often use the pattern symbolizing good wishes on clothing, which is our good wish and a kind of expectation and desire for auspiciousness. The hierarchical identity of the decorative patterns of Ming Dynasty clothing reflects the "Taoist" spirit of Chinese's pursuit of a high degree of unity of form and content in the

aesthetics of decorative design. The evolution of patterns on Western clothing is also constantly changing. During the Italian Renaissance, people liked to use floral patterns on clothing; during the Louis XV period, due to the influence of the Rococo style, Westerners liked to use S-shaped or curved vine patterns; while modern Westerners popularly chose Fauvist patterns.

3.6. Differences in the Performance of the East and the West in the Shape Structure. The aesthetic concept of Chinese clothing is expressed in the shape of the structure of the image, this kind of flat straight line and curve cutting method makes the clothes fit and not completely fit, not nude and publicity, not to try to bind, in the shape does not show the three-dimensional relationship with the human body. With this kind of flat cutting method without clear convexity, a white texture and harmonious and unified space shape were obtained. This kind of flat cut clothing style tends to be more holistic, and the Chinese-style wide clothes are as flat as the scrolls and fabrics when placed or hung, and their generosity and openness when dressed are clear at a glance (see Figure 5). The aesthetic characteristics of Chinese-style clothing reflect the aesthetic aspirations and cultural characteristics of the Chinese nation.

Chinese influenced by the complementary aesthetic ideas of Confucianism and Taoism attaches importance to the combination of reason and reason, pursues leisure, blandness, moderation, and pursues spiritual meaning beyond the body. The shape of traditional Chinese clothing emphasizes the longitudinal feeling, often sagging lines, long sleeves over the hand, barrel-shaped robe skirts, and vertical decorative techniques, making the human body appear slender. The costume is relatively fat, and the cuffs and hems have a wide sagging tendency. The slenderness of the shape of the costume compensates for the relatively short figure of the Orientals, produces optical illusions in the senses, and achieves perfection and harmony in proportion. The smooth shape of the garment matches the softer contour lines of Chinese's face as shown in Figure 5.

Due to the continuation of ancient Greek and Roman cultures and the intersection and fusion of classical, Christian and Germanic cultures over the centuries, clothing has moved from a loose style to a composite style. That is, the clothing structure has undergone a process from simple to complex, from flat to three-dimensional. This three-dimensional form has been maintained and continued for thousands of years in the history of Western clothing, so that the Western clothing form has become a shape based on plastic, and strives to express the three-dimensional cutting method of the human body, whether it is hung in the closet or worn on the body, or walked up, always maintaining a relatively static three-dimensional geometric space effect. This reflects the Westerners' exploration of space, with an obvious psychological motivation of "self-expansion," increasing the volume of clothing shapes, eager to occupy more space, and regarding clothing as a tool to expand their own body shape. This exaggerated costume shape maintains a certain distance between people and the whole of nature,

FIGURE 5: Costume modeling under the background of Chinese culture and western culture.

and between individuals and people, reflecting the cosmology of Westerners, but also reflecting the opposition between man and nature, mind and environment, subjectivity and objectivity. Especially after the Renaissance, clothing has been developed in a tortuous way again and again in the transition from natural shape to peak decoration and exaggerated shape. The different cultural backgrounds and aesthetic concepts of the East and the West have formed different ways of modeling in the clothing, reflecting different spiritual charms. With the development of today's economic globalization, the trend of integration of Chinese and Western costumes and cultures has also been strengthened as never before. Chinese clothing is also constantly in line with the world, traditional clothing design is gradually integrated into the Western fashion elements, while Chinese elements are also affecting the development of the international fashion industry. Although the Eastern and Western people have different shapes and concepts, it is the same desire to pursue the artistic conception of truth, goodness, and beauty in clothing. Today's clothing design to express the spirit of the times is to let the national spirit integrate into the world spirit, let the ancient spirit integrate into the future spirit, so that the different spirits and charms expressed in the background of different philosophies and aesthetic concepts in the East and the West complement and strengthen, so as to achieve the commonality of the mind and thought, so as to overflow with new spirits and concepts, and convey the inner charm of the atmosphere of the times.

3.7. Differences in Dress Styles in Chinese and Western Costume Cultures. Whether it is Ancient Chinese clothing or modern clothing, they are mainly under the upper and lower clothes, and they all follow the design style of opening and closing. In ancient times, clothes were mainly fixed by ropes and straps, and consisted of many robes. In the process of wearing, first wear a top, then a bottom, first a shirt, and then a layer of outerwear. Since modern times, China's clothing has become more and more frequent and simple, although it has also been impacted by foreign clothing culture, resulting in different closure designs such as dresses and sweatshirts, but in general, most of them still follow the style of opening and closing before and after, tops and pants.

Western clothing is divided and composed of multiple parts, so it is necessary to wear a underwear with a fixed effect first, and then wear various parts of the clothing according to the curve of your body. From the perspective of closure, Western clothes are mostly front closed and back open, and the elasticity of clothes is adjusted through the back rope. This closure has also continued into modern Western clothing design, such as cross-head dresses and sweaters.

The implicit and freehand nature of Chinese clothing and the directness and realism of Western clothing show two completely different philosophical views and values, which also forms a completely different aesthetic, which is manifested in the tailoring of clothing, and forms two distinct systems, namely the Chinese clothing culture system centered on straight line cutting and the Western clothing culture system centered on curve cutting. The former has created a "natural" and "flat" clothing form; the latter has created a "human," "three-dimensional" clothing form. The former is "made in one go," fully maintaining the original appearance of the cloth, the structure is very concise, is "nonconstructive"; the latter is based on the shape of the person to "disintegrate" the clothes, divided into several independent parts, respectively, after completing the shape of these parts and then assembled, the structure is complex, is "constructed." The former fully respects the existence of people, clothing modeling depends on the human body to complete its final shape, the degree of molding is low, mostly belong to the "semi-formed class"; while the latter often ignores the existence of people, the clothes themselves are a kind of "humanoid" "shell," many times it is forced to adapt to this artificial "shell," its degree of molding is higher, mostly belong to the "molding class."

4. Result Analysis and Discussion

4.1. Analysis of Characteristic Factors of Contemporary Chinese-Style Clothing

4.1.1. Questionnaire Design. In view of the recognition of Chinese and Western Chinese-style clothing, this study conducted a special survey, of which the questionnaire contains two main parts, first, mainly to learn the basic situation of the respondents and the basic understanding of Chinese-style clothing, such as gender, age, occupation, education level, personal monthly income, and whether the respondent has seen Chinese-style clothing, what Chinese-style clothing has been contacted; second, first, through the collation and summary of a large number of Chinese-style clothing design literature, and then by expert argumentation. Finally, through the identification of Chinese-style clothing elements in the 100 cases of pictures, and the analysis of the main constituent factors in the process of realizing the design of Chinese-style clothing, the materialization factors and social factors affecting Chinese-style clothing were extracted, of which 26 materialization factors were extracted, including embroidery, hand printing and dyeing, paper cutting, hand-painted ink, belly pocket, standing collar, placket, shoulder seam, slit, disc buckle,

brocade, cyan, red, yellow, white, black, green, purple, and planting object patterns, animal patterns, character patterns, Chinese character patterns, geometric patterns, blue and white porcelain patterns, tassels, and Chinese knots; four social factors: practical value, aesthetic value, humanistic value, and social value. Then, the "Five Point Scale" of Li Kete was applied to the above 26 materialization factors and 4 social factors to develop a questionnaire, and the participants evaluated the importance of each index according to their cognition of Chinese-style clothing, thereby determining the recognition of each element in the characteristics of Chinese-style clothing factors.

The respondents' basic situation table reflects that the randomness of sample collection is relatively ideal. The Chinese and Western respondents basically included people of different genders, different ages, different occupations, different academic qualifications, and different monthly incomes.

Among them, as shown in Figure 6 the proportion of men and women in China is basically the same, with men accounting for 45%; from the perspective of age structure, it is mainly under 25 years old, accounting for 76%; from the perspective of occupational composition, students account for the largest proportion, 74%; from the perspective of academic structure, bachelor's degree and above account for the largest proportion, a total of 86%. "Among them, undergraduates accounted for 72%; from the perspective of monthly income structure, it was mainly below 2,000 yuan, accounting for 59%, which was mainly related to the respondents as students. The proportion of men and women in foreign respondents is basically the same, and there are slightly more women, accounting for 64%; from the perspective of age structure, it is basically distributed between 25 years old and 26–30 years old, accounting for 43%, respectively. With 31%; from the perspective of career level, the proportion of students is the largest, 64%; from the perspective of academic distribution, bachelor's degree and above account for the largest proportion, of which undergraduate is 50% and master's degree and above is 29%." From the monthly income structure, the ratio of each level tends to be balanced, of which 23% is less than 2000 yuan, and 17% is 17% of 2001–5000 yuan. 5001–10000 yuan accounted for 36%. About 10001–50000 accounted for 20%, more than 50,000 yuan accounted for 4%. Since the attention to clothing is concentrated in women, young and middle aged, highly educated, and middle class, therefore, the selection of domestic and foreign samples has a certain rationality.

4.1.2. Questionnaire Recycling Analysis. In order to obtain the basic understanding of Chinese and Western style clothing, the questionnaire identified the question "Do you think there is a Chinese-style costume in contemporary times?" "9% and 17% of people outside China and the West believe that there is no Chinese-style clothing, so the subsequent analysis cannot be included in the statistics, so the real effective questionnaire is 197 in China and 58 in the West."
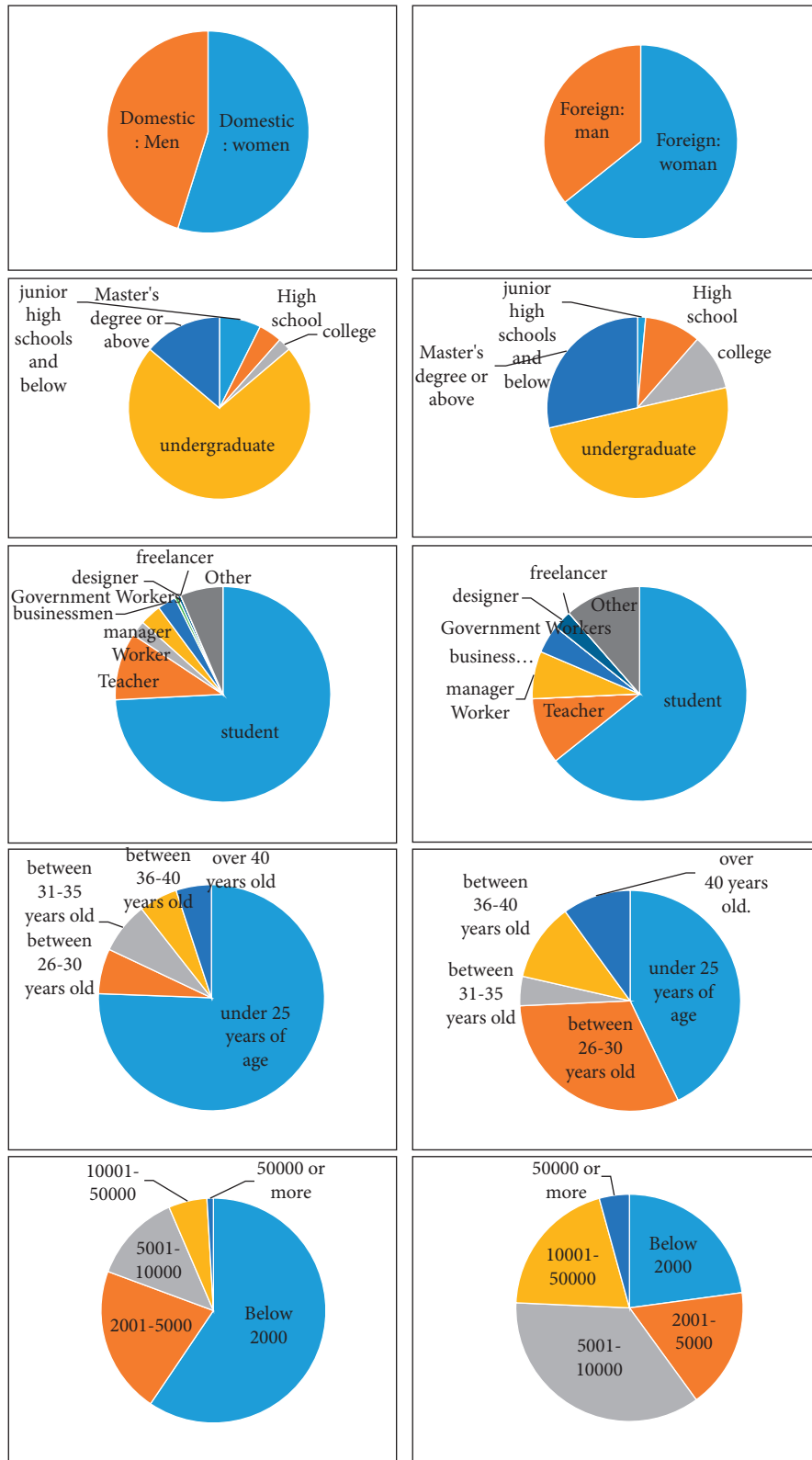
FIGURE 6: Analysis of different components at home and abroad to compare the situation of different respondents.

It can be seen that 6% of people in China believe that they have no understanding of Chinese-style clothing, 69% of people think that they do not know much about Chinese-style clothing, and 24% think that they know only 1% about Chinese-style clothing.. It can be seen that most people in China think that they do not know much about Chinese-style clothing; 14% of people in foreign countries (in the West) think that they have no understanding of Chinese-style clothing, 52% think they do not know much about Chinese-style clothing, and 27% think that they know little about Chinese-style clothing, and 7% of people think they know all about Chinese-style clothing. About 75% are completely unknown and poorly understood at home, 67% are foreign, 25% are understood and fully understood domestically, and 1% are foreign. It can be seen that the degree of understanding of Chinese-style clothing is similar in China and in the West.

It can be seen that the degree of recognition of Chinese-style clothing in China is higher than that of Western countries, of which 91% of people in China believe that there is a Chinese-style clothing, and only 83% of people in the West think that there is a Chinese-style clothing; 90% of people in China think they have seen Chinese-style clothing, and only 76% of people in the West think they have seen Chinese-style clothing; 81% of people in China like Chinese-style clothing, and 79% of people in the West like Chinese-style clothing, which is the same as in China; for whether Chinese-style clothing is needed, The difference between home and abroad is relatively large, 93% of people in China think that they need Chinese-style clothing, while only 60% of people in the West need Chinese-style clothing; but the proportion of Chinese-style clothing in the West is 36%, while the proportion of domestic purchases of Chinese style clothing is 30%, lower than abroad.

Through the questionnaire setting, the identification of Chinese and Western social general groups in Chinese and Western society whether Chinese-style clothing is suitable for the popularity of contemporary clothing, and whether Chinese-style clothing needs to be improved and progressed, so as to provide reference for Chinese-style clothing to better adapt to Chinese and Western clothing fashion.

5. Analysis of the Reasons for the Difference between Chinese and Western Clothing

The Chinese nation's thousands of years of history and culture contain a profound costume culture, under the accumulation of these historical and cultural precipitations, China's unique aesthetics and clothing forms have been formed, and Chinese clothing emphasizes more on "the unity of things and me," which is contrary to the West. Western clothing culture emphasizes the separation of subjectivity and objectivity, believing that "things" and "I" are opposites. Therefore, traditional Chinese clothing is mainly based on wide clothes, while the West is mainly based on clothes that outline the beauty of human lines. The difference between Chinese and Western clothing isactually the difference in moral concepts between Chinese and Western cultures. In essence, the cultural differences between China and the West are essential. The Chinese culture is the overall culture, while the West is the individual culture. In terms of thinking, the Way of Thinking of Westerners is partial and polarized. And Chinese way of thinking is holistic and impartial. In terms of personal values, Westerners focus on the self, they are the center of everything, and everything revolves around themselves.

Westerners believe that there is an individual who has a society, that he himself is the foundation of the whole society, and that the individual is higher than the whole. Chinese values emphasize the whole, and personal interests are subordinated to the interests of the whole, with the whole as the core. Because of different cultural and historical environments, the moral concepts of Westerners in culture are in stark contrast to the moral concepts of our Chinese culture.

The moral concept of Chinese is based on the composite social ethics and moral code of conduct established by Confucian and Taoist culture, including the moral thought of Taoism, the promotion and restraint of Confucian moral principles such as benevolence, righteousness, wisdom, loyalty, and benevolence. These are moral concepts unique to Chinese. These moral concepts and norms have effectively maintained the stability of the social system and society. The Western moral concept is based on ancient Greek philosophy and Christianity, and the establishment of its moral concept from the aspects of cultural traditions, economic structure, political system, and interpersonal relations makes the modern Western ethical and moral system manifest as an ethical system of active external seeking. Western morality is mainly manifested in: the pursuit of individualism, advocating freedom, daring to take risks, honesty and extroversion, frankness, and straightforwardness. Therefore, the differences between Chinese and Western clothing are inseparable from their culture.

6. The Fusion of Eastern and Western Costume Cultures

As a cultural form, clothing runs through the history of various periods in the East and the West. In the long process of human development, Chinese clothing and Western clothing have embarked on different development directions because of different aesthetic consciousness. Chinese clothing culture pays attention to the pursuit of the spiritual level, and the clothing style is relatively conservative, showing a dignified, elegant and subtle oriental atmosphere. Western clothing culture pays attention to the pursuit of scientific level, and the pursuit of clothing styles is attached to the wearing of human forms, so the curve of clothing is obvious, showing the beauty, boldness, and elegance from practicality. However, in the long history of development, Eastern and Western clothing has also had a convergence of styles, especially since the successive changes in Eastern and Western clothing in the early 20th century, this integration has affected the development of the entire social clothing style: Oriental clothing has absorbed the three-dimensional

cutting method of the West, making the clothing close and lightweight; the West has abandoned the distorted human beauty and liberated women from the corset that damages health. Moreover, in order to adapt to life, both the East and the West have changed the tedious decoration and clothing structure. With the development of today's economic globalization, the trend of integration of Chinese and Western costume culture has also been unprecedentedly strengthened. The Chinese garment industry is striving to integrate with the world, take a fashion plus national characteristics road, and integrate Western fashion elements into traditional clothing design, while Chinese elements are influencing the development of the international fashion industry. In the 20th century, when the French costume designer Yves Saint Laurent held a retrospective exhibition of his works at the National Art Museum of China, he said in the preface: "We Westerners have received a lot from China!" And modern Western designers are increasingly borrowing and applying Eastern and ethnic elements in their designs. China is an ancient country with a history of 5,000 years of civilization, as a garment worker should "use foreign for Chinese use," learn from the Western costume culture, so as to develop its own national costumes. While discussing the cultural differences between Chinese and Western costumes, we should also think about the importance of maintaining national characteristics under the impact of globalization. Therefore, it is of great significance to explore the differences between Chinese and Western costumes.

7. Conclusion

In ancient China, clothing was often seen as a manifestation of power and status. As a country of etiquette, China attaches great importance to etiquette and system, and the clothing of Chinese is the external expression of etiquette culture. Traditional Chinese clothing pays attention to the "unity of heaven and man" in design, emphasizing the inner pursuit. Traditional Chinese clothing follows a law and a norm, which is a "Taoist" aesthetic. The clothing culture of Westerners is very different from that of China, and the West advocates human beauty and requires clothing to better outline the beauty of the wearer's body and lines. In the eyes of Westerners, the human body line is beautiful. Therefore, the aesthetic design of clothing requires that the shape of clothing and the wearing of clothing can fully and perfectly reflect the beautiful posture of the human body, which can be said to be a "humanized" aesthetic concept. The difference between the aesthetic concepts of "Taoization" and "Humanization" in Chinese and Western clothing design has been reflected to varying degrees in the clothing design of various dynasties in China and the West for thousands of years. This study compares the aesthetic concepts of Chinese Design in the Ming Dynasty and the Western Renaissance in the same period from the three aspects of clothing, color, and decoration, and the difference between this kind of "Taoization" and "Humanization" can be seen slightly.

From the perspective of intellectual archaeology, why should we study the cultural differences between China and the West? Because the differences in Chinese and Western clothing are influenced by culture. In the past, when we discussed clothing, we chose to do a specific content description, using the same or different statements to summarize and express, but we may ignore the exploration of the essence of culture. Because the reason for understanding the differences between Chinese and Western clothing is to explore the cultural differences between China and the West, not only those specific meanings that seem to have been summarized by predecessors, but also a lot of deeper logic, meaning, and discourse expression behind them, which need to be further explored.

With the development of economic globalization, the trend of combining Chinese and Western costume culture will gradually strengthen, before we learn from the Western costume culture, the first thing to do is to continue to add the inheritance of China's traditional costume culture, take its essence, remove its dross, innovate, and innovate, so that the excellent traditional Chinese culture can be continuously circulated. Combine it with modern design concepts, learn the humanistic concept of Western clothing, and combine the two to make our Chinese clothing culture develop better.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

The Protection Mechanism of Personal Health Information in the Digital Economy Environment

Nan Liu [1] **and Shiyong Chen** [2]

¹School of Law, Southwest Medical University, Luzhou 646000, Sichuan, China
²School of Marxism, Southwest Medical University, Luzhou 646000, Sichuan, China

Correspondence should be addressed to Shiyong Chen; csy528@swmu.edu.cn

With the application of big data technology in the medical field, personal health information is experiencing unprecedented challenges while showing great value. Opportunities and risks are like two sides of the same coin, and the rapid development of science and technology has not only brought valuable opportunities, but also made modern society seem to have developed into a risk society. Although countries around the world are committed to promoting the development and application of medical data and pay great attention to the protection of personal health information, the risk attributes of personal health information have rarely been mentioned before. This article first introduces the origin and development of medical big data, paving the way for the special risks faced by personal health information in this context. Then, through the introduction of concepts and characteristics, the content of personal health information is accurately defined. Next, according to a large number of personal health information security incidents, the new semantic scope of personal health information risk in the medical big data environment is analyzed, the necessity of personal health information risk regulation is emphasized, and the value conflicts that may occur in the process of personal health information risk regulation are clarified, laying the groundwork for the establishment of the risk decision-making procedure in the following article.

1. Introduction

The rapid development of the Internet and the emergence of emerging technologies such as cloud storage and cloud computing have made all kinds of data in modern society grow explosively, and the concept of big data has emerged and risen in this process. Nowadays, big data has shown great value and is widely used in various fields of economy and society [1]. The development of medical big data is the deep integration of big data and the medical industry, which is of great significance for clinical treatment, infectious disease prevention, drug research and development, etc. In this process, personal health information increasingly appears in all aspects of the medical-related field, and the in-depth analysis of data and the sharing of information between institutions continue to explore the scientific research and commercial value of personal health information, but also make the risk of personal health information being

leaked more and more. On the other hand, personal health information is placed in the context of big data, and the huge scale of data makes the harm in the event of a leak accident that is unmatched in the past.

In the face of the threat of a risk society, the risk prevention mechanism of modern society does not seem to be fully prepared. Although each country and region have adopted the necessary protection measures for personal health information in different ways, due to the particularity and sensitivity of the content, the response to the risk of personal health information is higher than that of general information. At present, regulatory theories and schemes oriented to modern risks are mainly concentrated in the fields of nuclear safety, environmental safety, and food safety, while the risk attributes of personal health information are almost not mentioned. But in fact, the emergence of medical big data has rapidly magnified the risk of personal health information to a level that cannot be ignored.

Therefore, how to take effective measures to control the risk of personal health information in the big data environment will be a problem we have to think about [2].

2. Personal Health Information under Medical Data

The concept of big data and related technologies was born during the explosive growth of the Internet industry, dating back to around 2000. Its real attention stems from its outstanding performance in the economic field, with the release of research on the big data-driven economy by well-known research institutions such as McKinsey and the World Economic Forum in 2011, and a big data boom has been set off worldwide. Big data has become a hot topic in recent years, accurately grasping the characteristics of big data 4 V: namely, volatile (scale), variety (diversity), velocity (real time), and value (value) are the keys to understanding big data, as shown in Figure 1.

At present, the emerging technology industry represented by big data not only is an important driving force for China's economic development, but also profoundly changes people's way of life. Under the dual role of policy support and social needs, China's big data industry has also shown a healthy and rapid development trend in recent years. It is estimated that the scale of China's big data core industry will reach 58.6 billion yuan in 2020 [3]. The changes that big data has made to people's lives are reflected not only in the huge growth of economic scale, but also in all aspects of people's lives. The deep integration of big data with the government and other industries is an important driving force for the formation of innovative development, and it is also the most direct embodiment of improving people's lives. In the "Internet+" model, big data is widely used, "Internet + government affairs," "Internet + education," "Internet + culture," "Internet + transportation," etc., using public management, education, culture, transportation, and other fields of big data to develop a variety of convenient applications and platforms, greatly facilitating the daily life of the people, but also greatly improving business efficiency. "Internet + medical" is produced in this context, and the application of big data in the medical field, for disease treatment, infectious disease prevention, medical technology development, and hospital management, has far-reaching significance. Personal health information is an important part of medical big data, and its value can be fully explored to improve the level of medical and health services and other significance, the development of medical big data technology is also moving in this direction to a large extent, but at the same time, new technology also brings new risks to personal health information security. In order to achieve effective risk management, it is important to understand the risk specificity of medical big data and personal health information [4–6], as shown in Figure 2.

2.1. The Definition and Connotation of Personal Health Information.
Personal health information is an important part of personal information, and clarifying the concept of
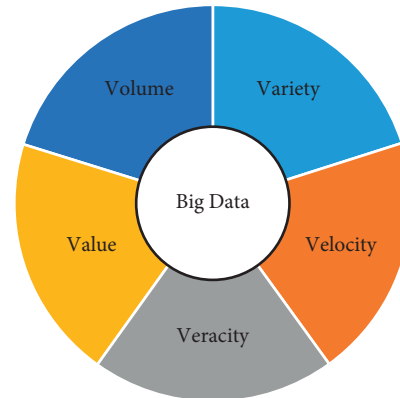
FIGURE 1: Features of big data.

personal information helps to correctly define personal health information. Although there are differences in the definition of personal information and the enumeration of specific types of personal information in different laws and regulations in China, they all recognize the "identification theory" of personal information; that is, the main feature of personal information is that it can identify specific individuals, and the Cybersecurity Law defines personal information as "All kinds of information recorded electronically or otherwise that can be used alone or in combination with other information to identify a natural person personally."

Privacy and personal medical information protection correspond to private and sensitive information, respectively. The difference between the two is mainly reflected in the fact that private information and sensitive information belong to different types of protection, which correspond to different types and methods of protection of civil rights and interests, and have different emphases [7]. In addition, the distinction between sensitive and nonsensitive information stems from the fact that the behavior of information processors is oriented to different objects, and the Personal Information Protection Law regulates from the perspective of personal information processing, focusing on the interpretation of the dimensions of individual information protection.

Broken down into the medical field, medical activities will involve a large amount of personal health information. However, China's laws are less related to the protection of personal health information, and the concept of personal health information has not been uniformly identified. Article 3 of the Measures for the Administration of Population Health Information (Trial Implementation) stipulates that personal health information is the basic population information and medical and health service information generated in various types of medical and health service establishments [8]. The "Information Security Technology Personal Information Security Specification" stipulates that personal health and physiological information only refers to various types of medical records and other information related to personal physical health conditions generated by personal illness and treatment. There is also no consensus on the definition and connotation of personal health
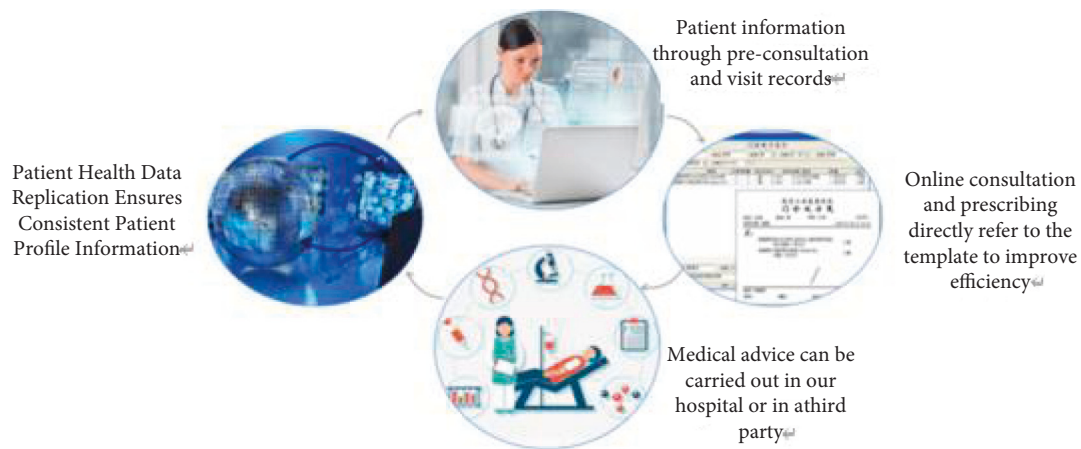
FIGURE 2: Typical Internet health service model.

information. Some scholars believe that "personal health medical information mainly refers to personal body characteristics, health status, interpersonal contact, genetics, medical history, and medical records involved in the process of physical examination, diagnosis, treatment, disease control, medical research process, etc.," and some scholars believe that "personal medical information not only includes the physical or mental health of the information subject, and information such as medical conditions also includes basic personal information and personal economic information related to medical treatment." It can be seen that the main controversy in the definition of personal health information in China's academic and legislative circles is whether personal health information is limited to information related to personal physiological and mental health conditions, and whether it can also contain basic personal information and economic information related to medical treatment.

Figure 3 shows the whole process of residents seeking medical treatment. China's personal health information is mainly generated in medical and health activities, so by analyzing the information generated in the process of personal medical treatment, we can better define the definition and connotation of personal health information. During the process of personal medical treatment, the doctor must provide the doctor with basic personal information such as his name, gender, and contact information, as well as relevant health information such as symptoms, family genetic history, and past medical history. In the process of diagnosis and treatment, the doctor produces the patient's symptom records, CT, and other examination records, and surgical conditions and other diagnosis and treatment information. It can be seen that the information generated by individuals receiving medical services is composed of two parts: personal identity information and diagnosis and treatment information; the former is the general personal information that can identify a specific natural person, and the latter is the information related to medical behavior involving the physical and mental health of the individual. In order to distinguish between the protection of personal health information and general personal information, the author believes that personal health

information refers to information related to an individual's physical and mental health conditions generated in medical activities such as physical examination, diagnosis, and treatment, and can be identified individually or in combination with other information. Its content mainly includes basic health information that can help correct diagnosis and treatment, such as clinical symptoms, family medical history, drug allergy history, and past medical history, and health information generated in the process of medical services, such as examination results, surgical records, and anesthesia records [9–11].

2.2. Identification of Personal Health Information and Medical Privacy. When it comes to the protection of personal health information, it is easy to link it with patient privacy, and there are many scholars in the relevant literature who equate patient privacy with personal health information protection. But in fact, protected personal health information and patient privacy are two different concepts. Privacy and personal medical information protection correspond to private and sensitive information, respectively. The difference between the two is mainly reflected in the fact that private information and sensitive information belong to different types of protection, which correspond to different types and methods of protection of civil rights and interests, and have different emphases. In addition, the distinction between sensitive and nonsensitive information stems from the fact that the behavior of information processors is oriented to different objects, and the Personal Information Protection Law regulates from the perspective of personal information processing, focusing on the interpretation of the dimensions of individual information protection, as shown in Figure 4.

(1) The extensions of the two intersect with each other. China's legislation does not clearly define the connotation of privacy, but from the analysis of the semantic interpretation of privacy and the relevant legislative provisions, the academic circles generally believe that privacy generally refers to the private secrets of personal private life tranquility or private

FIGURE 3: The whole process of residents seeking medical treatment.

FIGURE 4: Privacy of personal information data in the field of health care.

health information that can identify the information subject himself or herself that is not disclosed is health privacy, but personal health information includes not only health privacy information that does not want others to know, but also information that has been disclosed.

(2) Whether or not there is a property interest is different. Medical privacy contains personal interests, closely related to the reputation and dignity of individuals, and infringement of personal privacy will often cause personal life tranquility destruction and personal spiritual pain, and will not cause damage to personal property interests. Although personal health information also points to the personal dignity and interests of the information subject, it also contains property value. In the information age, various institutions and organizations have gradually tapped the economic value of personal health information. Personal health information can help organizations achieve business activities such as customer base profiling, market condition surveys, and strategy development. At the same time, after processing, health information itself becomes a data product that can be traded.

(3) It is different from the relevance of the public interest. Privacy is information that private individuals do not want others to know or that is inconvenient for others to know, and it is generally considered that the domain belonging to the self is not closely related to the public interest. Unlike privacy, personal health information is closely related to the public interest, and personal health information itself has public welfare value. Especially in the prevention and treatment of the epidemic and medical research, the collection and processing of personal health information can help the progress and development of medicine [13].

life information that individuals do not want to disclose or are inconvenient to be known by others [12]. (2) Medical privacy emphasizes privacy and nondisclosure, including the patient's personal body privacy, the patient's medical information privacy, and the patient's personal space privacy. The important feature of personal health information lies in the identity of the subject; that is, others can identify a subject through this health information. Some

2.3. The Legitimacy of Special Protection of Personal Health Information

2.3.1. The Particularity of Personal Health Information Itself. In addition to the common characteristics of general personal information such as identifiability, personal health information has its particularity due to the high professionalism and particularity of medical activities, which is mainly reflected in the following aspects:

(1) Personal health information is sensitive and carries higher personality interests. Although there is no consensus in the academic circles on the legal attributes of personal information, it is recognized that personal information carries personality interests. Through the collection of personal information, the information subject's information personality is formed, ensuring the consistency and authenticity of personal information and the true self, and the information subject's control over its information, which is related to the personal dignity and personality autonomy of the information subject, and carries the most basic personality rights and interests that the information subject should enjoy. (2) Personal health information involves private and sensitive information such as personal health status, which is more closely related to personal dignity, and once it suffers damage, the damage to the information subject is more lethal. Due to the professionalism of medical service activities, personal health information is mostly composed of various medical terms and professional terms, such as hepatitis B antibodies and antigen detection indicators. It is difficult for nonmedical professionals to correctly understand the actual meaning of various types of information, and it is easy to misunderstand the information subject [14]. Therefore, the improper disclosure of personal health information or other violations can easily cause the social evaluation of individuals by the outside world to decline, so that individuals suffer discrimination in social life such as employment and insurance, and even cause great psychological pressure to individuals [15]. For example, although the law stipulates that except for certain specific occupations, employment may not be refused on the grounds of having hepatitis B, there have been many cases of discrimination against the employment of hepatitis B virus carriers in China.

(2) Vulnerability of personal health information. First, healthcare organizations are able to quickly and accurately collect patients' personal health information. Personal health information is mostly generated in medical behavior, and patients will consciously take the initiative to medical staff out of their emphasis on personal life and health and trust in medical staff Disclose a large amount of personal health information [16]. The medical activities are highly professional and complex, and patients are unable to judge on their own whether the collection of personal health information in the process of medical service provision exceeds the necessary limits due to the lack of medical knowledge. In the general network information collection, consumers can choose not to disclose their personal information, but patients lack selectivity in the process of personal health information collection. Patients have the obligation to cooperate with medical institutions in the process of medical treatment and provide comprehensive and accurate personal health-related information. Second, the subjects of personal health information that can be contacted are diversified and complicated. Medical services involve multiple business process nodes such as "registration, consultation, inspection, examination, and treatment," and the staff of each node, such as doctors, nurses, and medical administrators, may have access to the patient's health information [13]. (1) The widespread use of electronic medical records has changed the path of dissemination and control of medical information, enabling more unauthorized institutions or individuals to easily access personal health information. The openness and sharing of the Internet enable multiple users to use the same kind of electronic medical records at the same time, and personnel in different regions can also remotely access electronic medical records. (2) Patient health information can break through the limitations of space to use, store, circulate, and transmit between multiple departments. For example, in 2017, Chongqing completed the interconnection of electronic medical records of various medical institutions in the county and realized the sharing of electronic medical records across medical institutions. The open nature of the network significantly expands the range of subjects that can be reached, not only within the medical institution but also to the third-party commercial institutions on which the electronic medical record is established. Finally, patients have poor awareness of the protection of their personal health information and cannot choose to delete their personal health information. The protection of personal health information in China's laws mainly depends on the provisions on the confidentiality obligations of medical institutions, and patients only pay attention to the prevention and treatment of their own diseases and pay little attention to the subsequent use and storage of personal health information, giving criminals the opportunity to take advantage. In the general personal information, the information subject may request the correction or deletion of personal information. In medical activities, the law clearly stipulates that medical institutions have the obligation to keep patients' medical records, and medical institutions must properly keep patients' medical records within the statutory time, so the information subject requires medical institutions to delete the records of personal health information subject to time restrictions. As a result,

personal health information is more vulnerable to infringement than general personal information.

(3) The comprehensive utilization value of personal health information is high. Employers, insurance companies, drug manufacturers, and medical researchers all want access to a wealth of personal health information for analysis. (3) For relevant institutions engaged in the health industry, the analysis and utilization of personal health information can generate great commercial value. For example, pharmaceutical manufacturers can tap market demand, develop new products, and carry out precision marketing by analyzing personal health information; medical service institutions can form a personal health portrait of the information subject through a comprehensive analysis of personal health information and provide customers with personalized health service programs [13]. (4) In addition to being used for the treatment of individual patients, personal health information plays a major role in the prevention and treatment of epidemics, medical research and education, and the allocation of medical resources. (1) If an epidemic or infectious disease breaks out, it can be developed by collecting patient health information for epidemiological statistical analysis. Without sufficient accurate and comprehensive information on the causes and routes of transmission, the identification of disease outbreaks may be delayed to an extent that is difficult to control [17]. Health facilities can use personal health information to analyze population health trends, compare the cost and quality of care, and compare and evaluate treatment outcomes. Through the tracking and analysis of personal health information, medical research institutions can help researchers understand the natural process of diseases or the complex relationship between different diseases, promote the development of national medical technology level and quality, and provide the possibility of curing difficult medical records. (2) The state can obtain a complete national health information database after collecting and processing national health information, according to a large amount of information in the information database, the state can carry out disease prevention and rational allocation of medical resources, and personal health information can become a national strategic resource. Therefore, personal health information has both commercial value and public welfare value.

2.3.2. The Inevitable Requirements of the Information Age.
Technical issues are the primary problem facing the development of medical big data, which directly affects whether medical big data can develop rapidly and effectively, and whether it can play a key role in the construction of digital health. Compared with the backward level of technology that may bring about the low efficiency of medical big data applications, the ethical problems faced by medical big data may be more severe. In the era of medical big data, patients' personal health information is widely present in mobile apps and the Internet. The massive, interactive, shared, dynamic, and other characteristics of medical big data determine that compared with the traditional medical data storage and application methods, the risk of personal health information leakage is undoubtedly significantly increased in the era of medical big data.

2.3.3. Necessary Conditions for the Cross-Border Flow of Personal Health Information.
In the information age, the cross-border flow of personal health information has become the norm, and the personal information protection law generally has extraterritorial effects. Judging from the personal information protection laws enacted by many countries and regions, they all try to distinguish between the protection of sensitive information and general personal information. Although the sensitivity of citizens of various countries to different information is not consistent based on the different historical and cultural backgrounds of various countries, it is stipulated that personal health information is sensitive information and personal health information is strictly protected. For example, in 1981, the European Council promulgated the Agreement on the Protection of Individuals concerning the Automated Processing of Personal Data, which for the first time clearly defined sensitive personal information and made special provisions for the automated processing of such information. Since then, in the process of data legislation in the European Union, the types of special data have been clarified and the collection and processing of such data have been strictly restricted. Legislation on the protection of sensitive personal information in the USA is fragmented, and specific information protection laws are enacted in certain industries. For personal health information in the medical industry, the USA has specially enacted the HIPPA Act to protect personal health information [18].

Personal health information in the information age is not only related to the personal interests of information subjects, but also becomes an emerging strategic resource of the country. At present, in the international information exchange activities, many countries outside the region have formulated strict requirements and standards for the protection of personal health information, and if the protection of health information in China does not meet the standards formulated by countries outside the region, it will restrict the exchange of information between China and them, and even refuse China's information exchange activities. Therefore, in the face of the universality of special protection of personal health information outside the region, if special protection is not given to personal health information, it will lead to the "double standard" of personal health information protection at home and abroad, and China will not be able to carry out equal health information exchange and trade with the European Union, the USA, and other countries. The strict protection of personal health information outside the region makes it impossible for relevant institutions in China to obtain the health information of foreign citizens. On the

contrary, China's loose protection of personal health information allows institutions outside the country to easily obtain personal health information of Chinese citizens and then use large quantities of health information for commercial or research activities, which will threaten China's economic and social development and even endanger national security. To this end, China has tried to protect personal information based on the sensitivity of information. For example, China's criminal law first focused on the protection of personal information, and as early as 2009, the serious violation of personal information was classified as a criminal act. With the refinement of the determination of the crime of infringing personal information, China adopts the criteria of "five hundred articles" or more for the determination of "serious circumstances" of infringement of personal health information, compared with general personal information. More than 5,000″ criminalization standards, China's criminal field has taken stronger protective measures for personal health information than ordinary information. Regrettably, the protection of personal health information in the field of private law in our country is still weak [19].

3. The Risks Faced by Personal Health Information in the Big Data Environment

3.1. Analysis of the Types of Infringement of Personal Health Information. In the process of large-scale medical informatization reform, the important use value of personal health information has been highlighted, and the types of personal health information infringements have been varied. According to the circulation process of personal health information, the specific types of violations are divided into four aspects: improper collection of personal health information, improper disclosure of personal health information, improper use of personal health information, and improper preservation of personal health information.

3.1.1. Improper Collection of Personal Health Information. Illegal collection and excessive collection of personal health information are improper collection of personal health information. Illegal collection refers to the collection of health information by others without a lawful basis for information collectors and the improper collection of health information. For example, in the case of "Dispute over the Privacy Rights of Zhang X, Zhang X A, etc., with Suiping County People's Hospital and Wei X X," the defendant illegally collected the patient's medical records from other institutions without the consent of the patient and without legal procedures, for the needs of his litigation interests, and presented it in another litigation trial. Excessive collection refers to the collection of personal health information beyond the specific purpose of collection and the collection of health information unrelated to the specific purpose of collection.

The subjects of personal health information collection include healthcare providers and nonmedical service providers. For medical service providers, the collection of personal health information is a prerequisite for the development of medical and health activities, and the basic information and health and physiological conditions of individuals are the basic information necessary for medical activities. However, China's laws lack provisions on the scope, subjects, and procedures for collecting personal health information. In reality, various medical service institutions often collect according to the actual needs of their own work, and a large amount of information is collected repeatedly. At the same time, patients lack the ability to identify the scope of personal health information collection and self-protection awareness, and medical institutions such as hospitals often over-collect personal health information for utilitarian purposes. For nonhealthcare providers, the commercial value of personal health information often attracts them to excessively collect or even illegally collect personal health information out of the needs of their own interests, causing harm to the information subject, as shown in Figure 5.

3.1.2. Improper Disclosure of Personal Health Information. Personal health information controllers disclosing or providing personal health information to other institutions or individuals without the explicit consent of the information subject or without other legitimate reasons are an improper disclosure of personal health information. In practice, there are many incidents of improper public disclosure of personal health information. For example, in the case of Lü Weiwei, Tang Baohua, and others in a dispute over the right to reputation with Hubei Radio and Television Station and Wuhan Mental Health Centre, the hospital provided the patient's medical record information to the TV station without the consent of the guardian of the mentally ill patient, and the TV station made it public, bringing great mental pressure to the patient.

Both traditional medical ethics and laws clarify the obligation of medical service providers to keep personal health information confidential, and personal health information shall not be disclosed without the consent of patients. The illegality of improper disclosure of personal health information is mainly manifested in the infringement of the right of information subjects to independently decide whether their health information can be known by others and under what circumstances. Improper disclosure will make the personal health information of the information subject known to the unspecified person in society, which is very likely to affect the personal dignity and freedom of the information subject. Judgments on improper disclosure shall be based on whether there is a lawful basis for disclosure.

3.1.3. Improper Use of Personal Health Information. Improper use of personal health information includes the use of personal health information in violation of the scope of laws or agreements, the unauthorized use of personal health information of information subjects, the illegal use of personal health information for the purpose of information collection, and the illegal transaction of personal health information. For example, the medical staff of a hospital in

The most anticipated wearable device features

Feature	Percentage
Health	27.00%
Identity verification	21.00%
Message Notification	20.00%
Tools	11.00%
Entertainment	10.00%
Movement	9.00%
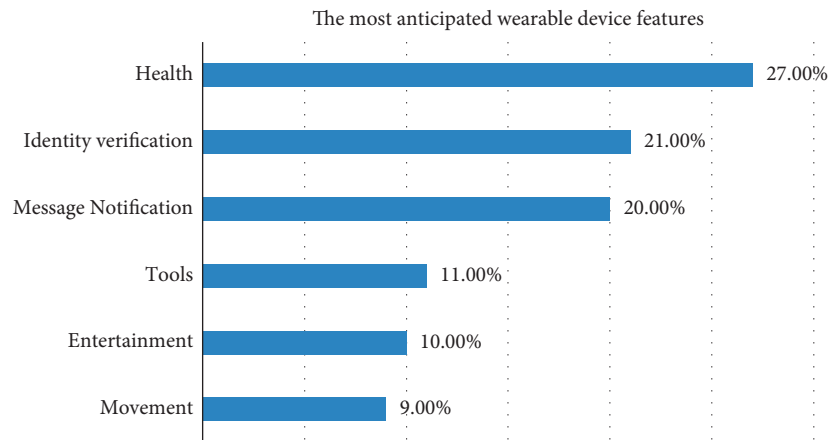
FIGURE 5: Personal health information collection of smart wearable devices.

Anshan City took advantage of their positions to sell the personal information of patients in the hospital to the milk powder sales personnel, and after investigation by the public security organs, the personnel sold more than 20,000 pieces of personal information of patients. A hospital in Rizhao, Shandong Province, introduced a set of tumor treatment equipment, in order to better create economic benefits, the use of television, newspapers, and other media without authorization to publicize and report the medical information of patient Wang's use of the equipment, which seriously affected Wang's normal life and caused Wang's mental pain.

The use of personal health information shall be controlled by the information subject, but once the personal health information is collected by the information collector, the individual's ability to control the health information is weakened, and the information collection controller can secretly complete the processing and use of personal health information. Once the information controller illegally or excessively uses personal health information, the damage to the information subject's control over personal health information is often accompanied by damage to the property interests of the information subject and the intrusion of the tranquility of private life, as shown in Figure 6.

3.1.4. Improper Storage of Personal Health Information. After the collection of personal health information, it is also necessary to save it legally, and the act of deleting or modifying personal health information in violation of regulations, or not keeping personal health information in accordance with regulations, causing information leakage is improper preservation of personal health information. With the advent of the era of medical informatization, electronic health information is more likely to be tampered with, the information asymmetry between information subjects and information collectors is becoming more and more serious, and it is often difficult for individuals to detect the deletion and modification of personal health information. For example, in the case of the privacy dispute between Cun Lili and Beijing Anorectal Hospital, the defendant's medical record data management was not strict, resulting in the

disclosure of the plaintiff's medical records, and the illegal merchants published the plaintiff's medical records online without the consent of the plaintiff and made them into CDs for sale, causing great mental damage to the plaintiff. A patient hospitalized in a hospital in Jiangxi Province had a dispute with the hospital due to a medical accident, the hospital falsified its medical records in order to win the lawsuit, resulting in obvious alteration of medical records, and the handwriting was also different in many places.

As can be seen from the above-mentioned cases, violations of improper preservation include both positive actions and negative omissions. The unlawfulness of improper preservation of personal health information is manifested in the damage to the completeness, accuracy, and safety of the information subject's personal health information. The complete accuracy and safety of personal health information are related to the personality rights and interests of the information subject. Maslow pointed out that "the integrity and authenticity of personality identification are the basic conditions for the subject to be respected by others." The accuracy and completeness of personal health information can ensure that the personal health profile of the information subject is not distorted, and the information subject can live with dignity.

3.2. The Current Situation of Personal Health Information Protection in China. At this stage, my country's personal information protection law is still in the drafting stage, and the legal provisions on personal health information protection are limited and scattered in the legal system of various departments, as shown in Table 1. At present, there are two modes of privacy protection mode and behavior regulation mode for the protection of personal health information in my country.

3.2.1. Privacy Model for Personal Health Information Protection. Privacy, especially patient privacy, is closely related to personal health information, so for a long time, China has relied on privacy to protect personal health information. As early as 1998, the Interpretation on Several
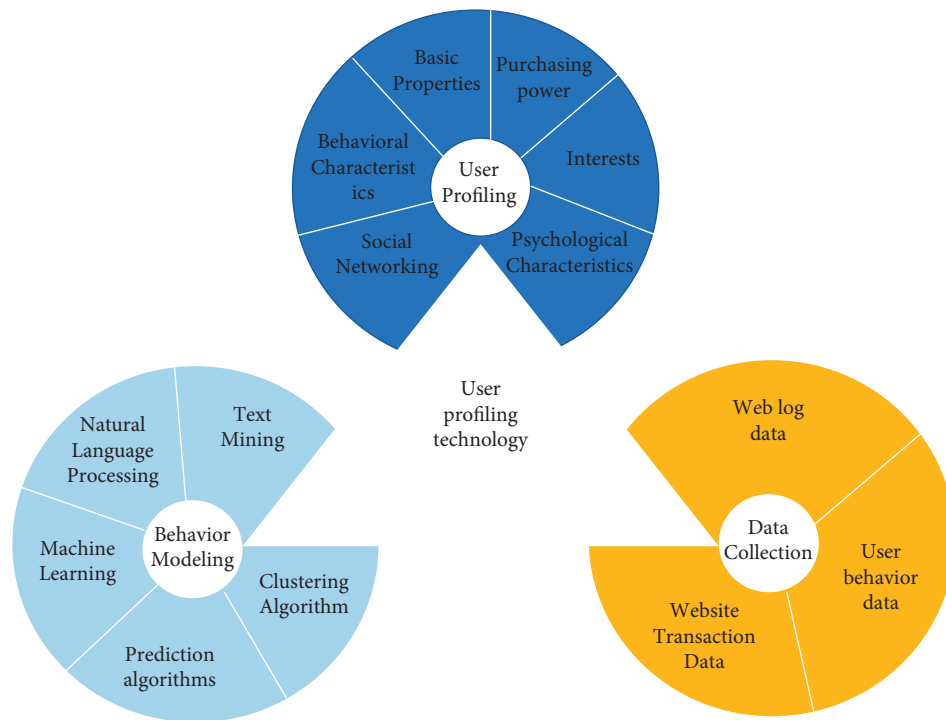
Figure 6: Personal health analysis based on user portrait technology.

Table 1: Regulations and systems for the protection of personal health information of medical big data.

Type	Content
Law	Article 111 of the Civil Code of the People's Republic of China Article 62 of Chapter 7 of the Law of the People's Republic of China on Authorized Responsibilities One of Chapter 253 of the Criminal Law of the People's Republic of China Chapter 1, Article 4 of the Mental Health Law of the People's Republic of China Article 42, Paragraph 6, of the Law of the People's Republic of China on Administrative Penalties for Public Security Article 34 of the Maternal and Child Health Care Law of the People's Republic of China Article 23, Paragraph 3 of the Medical Doctor Law of the People's Republic of China (effective as of March 1, 2022) Article 12 of the Law of the People's Republic of China on the Prevention and Control of Infectious Diseases Article 22 of the Cybersecurity Law of the People's Republic of China Article 38 of the Data Security Law of the People's Republic of China
Administrative regulations	Article 39 of the Regulations on AIDS Prevention and Control
Ministerial regulations	Regulations on the Administration of Medical Records in Medical Institutions (2013 Edition) Standard for the Application and Management of Electronic Medical Records (trial) National measures for the management of big data standards, safety and services of health care (trial) measures on the management of population health information Technical Guide for the Construction of Telemedicine Information System "The technology of data management in Linwei test is in southern China)"
National standard	Code for Personal Information Security of Information Security Technology Health Informatics Guidelines for Data Protection for the Cross-border Flow of Personal Health Information Information Security Technology Personal Information Security Impact Assessment Guide) ("Information Security Technology data fill out Security Assessment Zhainan (Grass Room)") "Information security technology personal information de-identification Zhainan" "Information Security Technology, Health and Medical Information Security in South China"
Guiding document	"outline of" healthy China 2030″ Plan "guiding opinions on promoting and standardizing the Application and Development of big data in Health Medical Care" on promoting the Development of Internet + 's Medical Health

Issues Concerning the Trial of Reputation Cases stipulated that medical personnel disclosed the condition of patients with sensitive diseases such as gonorrhea and syphilis without authorization and caused damage to the patient's reputation infringed on the patient's right to reputation, and medical privacy was included in the scope of protection of the right to reputation. With the promulgation of the Interpretation on Compensation for Moral Damages [2001] No. 7, privacy and reputation exist independently. The Law on Practicing Physicians, the Law on the Prevention and Control of Infectious Diseases, the Regulations on the Management of Medical Records of Medical Institutions, the Regulations on Nurses, and other health legislation stipulate the confidentiality obligations of medical institutions and medical personnel to the privacy of patients and stipulate that those who violate the confidentiality obligations shall bear administrative responsibility or even criminal liability. With the promulgation of the Tort Liability Law, the right to privacy began to emerge as an independent civil right. Article 62 of the Tort Liability Law stipulates that the privacy of the victim shall be exposed or disclosed. From the above legislative practice, it can be seen that China's privacy rights have experienced from "relying on the protection of the right to reputation" to "privacy interests" to "privacy rights." The evolution of the process. Article 12 of the 2014 Provisions on Several Issues Concerning the Application of Law in the Trial of Civil Dispute Cases Involving the Use of Information Networks to Infringe Personal Rights and Interests clearly stipulates that the medical record data of natural persons belong to personal privacy, and the protection of personal health information with privacy rights is gradually developed.

3.2.2. Code of Conduct for the Protection of Personal Health Information. The General Provisions of the Civil Law promulgated in 2017 set personal information independent of privacy protection and determined that the interests of personal information became legal interests that could be independently protected. However, the General Provisions do not set the right to personal information for information subjects, but protect personal information by regulating the behavior of information collection controllers. The 92nd Law on Basic Medical Care and Health Promotion, promulgated in December 2019, stipulates that "the state protects citizens' personal health information and ensures the security of citizens' personal health information." Citizens' personal health information must not be illegally collected, used, processed, or transmitted by any organization or individual, and must not illegally buy, sell, provide, or disclose citizens' personal health information. "As the basic law in the field of medical and health care, it declares the protection of personal health information, is highly in line with the provisions of the General Provisions of the Civil Law on the protection of personal information, and limits the behavior of the controller of information collection in the form of behavior constraints." Article 111 of the General Provisions of the Civil Law and Article 92 of the Basic Medical Care and Health Promotion Law define the code of

conduct for the three stages of collecting, using, and possessing personal health information. However, the above-mentioned provisions on the determination of "legal" and "illegal" need to be transferred to the relevant provisions of the Cybersecurity Law and the Measures for the Administration of Population Health Information.

Stage of collection and use of personal health information: Article 8 of the Measures for the Administration of Population Health Information stipulates that the collection and use of personal health information must comply with the principle of "minimum adequacy." Article 41 of the Cybersecurity Law stipulates that the collection of personal information must meet the principles of legitimacy and necessity and informed consent. Among them, the principle of "minimum sufficiency" can be absorbed in terms of effect into the principle of legitimacy and necessity. Specifically, the "principle of propriety and necessity" requires that users of information collection only collect personal health information that is necessary for business applications. The principle of "informed consent" requires that the purpose, method, and scope of personal health information collection must be open and transparent and must obtain the consent of users.

Personal health information holding stage: The information collection controller has the obligation to ensure the safety of personal health information. The Cybersecurity Law and the Measures for the Administration of Population Health Information stipulate that health information collectors should establish an information confidentiality system and take technical protection measures, remedial measures for information leakage, and notification rules.

The code of conduct model can provide a certain basis for judging the illegality of personal health information infringement in judicial practice and, to a certain extent, make up for the lack of discretion of judges' illegality judgments. The behavior guidance of information collectors and users in the whole process of health information circulation protects personal health information from the source and makes up for the lack of protection at the end of privacy.

3.3. Insufficient Protection of Personal Health Information in China

3.3.1. Lack of Legislation on the Specificity of Personal Information. For a long time, Chinese scholars have paid attention to the protection of personal information and formulated several drafts of the Personal Information Protection Law (Expert Suggestion Draft). However, China's Personal Information Protection Law has not yet been promulgated, the special legislation for personal information protection is lacking, and the definition of personal information concepts and connotations is vague, not to mention the definition of personal health information. Judging from the legal norms for the protection of personal health information, the overall distribution is scattered and the legislation is trivial. Judging from the legislative level involving laws on the protection of personal health

information, most of them are distributed in medical regulations with lower effectiveness levels, and most of them are administrative regulations or departmental rules. From the content of the legal provisions, many legal provisions only macroscopically emphasize the confidentiality obligations of medical institutions and medical personnel to personal health information, but for how to protect personal health information, the responsibility for infringing personal health information and other specific supporting systems are not perfect, so the current legal provisions are mostly the principle of protecting personal health information, which is poorly operable, which is embodied in the following: on the one hand, the law cannot reasonably guide the behavior of information collection controllers to collect and process personal health information. On the other hand, the rights and interests of information subjects for personal health information are not clear, and when the personal health information of information subjects is infringed, the information subjects cannot effectively safeguard their rights.

3.3.2. The Scope of Legal Benefit Protection for Health Information Subjects Is Narrow. In the information age, the protection needs of information subjects for personal health information have changed from passive defense to active control and utilization. The scope of legal interest protection of information subjects shall include all rights and interests related to information control and utilization, such as the knowledge, modification, and inquiry of information.

Rights protection legislation can directly define the scope of legal interests of information subjects. China has not enacted legislation to confirm the right to personal information, but has used privacy rights to protect the rights and interests of information subjects. As a passive defensive right, the core right of privacy lies in keeping secrets for the subject's private affairs, eliminating illegal intrusion, mainly in resisting intrusion and disclosure, dominating personal secrets and private living space, and excluding the intervention of others as the content of rights and interests. For information subjects in the information age, the legal benefits that information subjects should enjoy for personal health information are not only limited to passive defenses to avoid interference by others, but also reflected in the information subject's active control and use of personal health information. Therefore, the simple privacy protection model limits the scope of legal protection of information subjects.

The code of conduct legislation restricts the scope of information subjects' rights and interests by restricting the conduct of the actor. The General Provisions of the Civil Code and the Law on Basic Health Care and Health Promotion provide a negative list of the conduct of information collectors, but the negative list is closed and cannot comprehensively enumerate all the ways of conduct. It can be seen from the interpretation of the legal text that acts that do not belong to the negative list should be attributed to the freedom of conduct of the information collectors and users, so the normative legislation significantly narrows the scope of legal interest protection for information subjects.

3.3.3. The Protection of Personal Health Information and General Personal Information Has Not Been Realized. Personal health information is sensitive personal information, and special protection of personal health information is legitimate. At present, China's private law adopts a single behavior regulation for the collection, processing, and preservation of personal information, and information collection and processors in all aspects of information circulation need to comply with certain legal rules, mainly including the principle of legitimacy and necessity, the principle of informed consent, and the principle of security guarantees. However, from the perspective of the comparison between the general personal information and the personal health information protection rules, the law does not make special provisions on the principles for the collection and processing of personal health information, and there is no difference between the collection and processing of personal health information by the information collection and processing personnel and the general personal information, and the special protection of personal health information cannot be realized.

3.4. Lack of Civil Remedies for Health Information. From the perspective of the relief mechanism for infringement of personal health information, there is a legislative concept of emphasizing "criminal punishment and administrative management" over "civil relief," and health legislation tends to administrative and criminal remedies, stipulating administrative and criminal liability for infringement of personal health information, but lacking provisions on civil attribution and compensation. The personal interests and property interests suffered by the information subjects themselves cannot be compensated accordingly. For offenders, the lack of civil compensation provisions reduces the cost of violating the law by the perpetrators, further causing the rampant infringement of personal health information. Although the General Provisions of the Civil Law make it clear that personal information is protected, it does not make specific provisions on civil liability for acts of infringement of personal information. Judging from the judicial practice of personal information protection in China, when the health information of the information subject is infringed, the court still adopts the privacy right approach to remedy the rights and interests of the information subject.

The Tort Liability Law adopts enumerative provisions on the way of infringement of patient privacy and only stipulates two kinds of infringements: "leakage" and "disclosure of medical record information without consent." From the above analysis of the types of personal health information infringement, it can be seen that the infringement of personal health information in the information age not only is limited to improper disclosure and leakage, but also appears in a large number of improper collection, use, preservation, etc. All aspects of the circulation of personal health information may have various types of infringements. Therefore, the limited nature of the provisions on infringement is difficult to achieve effective remedies for information

subjects. The Tort Liability Law lists the circumstances in which the principle of presumption of attribution of fault is applied to the infringement of medical damages, but does not include situations in which medical institutions and medical personnel infringe on the privacy of patients. According to the regulations, the principle of attribution of fault is applied to tort liability for tort liability that does not clearly stipulate the application of the principle of presumption of fault, and the information subject whose health information has been infringed provides evidence to prove that the medical institution and medical personnel are at fault. However, the information of the information subject and the information collection controller is asymmetrical, the information subject is difficult to prove, and it is difficult to determine the infringer, the specific infringement, and the loss of the information subject, especially the economic loss. As mentioned above, in the context of medical informatization, the number of organizations and personnel that can access personal health information is increasing, the channels and channels of health information infringement are diverse, and it is difficult for the victim information subject to determine the specific infringer. The development of medical informatization has made the infringement of personal health information hidden, and it is often difficult for information subjects to detect the infringement. Therefore, it is significantly more difficult to protect the rights of information subjects when their personal health information is infringed.

At present, the protection of personal health and medical information in China has not yet formed a systematic legal norm, but only fragmented provisions in the provisions of laws and regulations, although the health and medical management departments to develop internal information security management norms, but generally not mandatory, data collection, storage and utilization more rely on self-discipline management. How to punish the improper handling of personal health and medical information is not particularly specific, and most of them are only relatively rough provisions in the Civil Code, the Public Security Administration Punishment Law, the Cybersecurity Law, the Basic Medical Care and Health Promotion Law, the Criminal Law, and other laws and regulations.

4. Improve China's Personal Health Information Protection Mechanisms

4.1. Enact a Unified Personal Information Protection Law. In view of the scattered legal provisions on the protection of personal information in China, most of which are legislative status quo stipulated in principle, it is impossible to effectively protect the personal health information of information subjects, and the special legislation on personal information protection is urgent. From the perspective of legislative models, the EU and the USA are typical representatives of unified legislation and decentralized legislation. The European Union regulates uniform legislation on the collection, processing, and retention of personal information by controllers of information collection. The unified legislative model can apply relatively consistent standards to protect

personal information, avoid conflicts of legal application between different laws, and provide strict protection for personal information. However, the value orientation of information protection and circulation in different industries may be different, and the one-size-fits-all legislative model may not be able to meet the requirements of information circulation in some industries. The decentralized legislative model of the USA can combine the characteristics of personal information in different industries for special legislation, which helps to protect sensitive personal information in particular and promote the circulation and sharing of general personal information. However, the decentralized legislative model will increase the cost of national legislation, and there will be overlaps between multiple laws, resulting in confusion and application of legal provisions.

As a civil law country, China has a more realistic basis for formulating a unified written law in China. In 2006, Zhou Hanhua formulated China's first "Personal Information Protection Law (Expert Proposal Draft)," and since then, many proposals formulated by Chinese scholars have generally adopted a unified legislative model to protect personal information. Among them, the "Personal Information Protection Law (Expert Proposal Draft)" formulated by Zhang Xinbao and Ge Xin, under the premise of adopting a unified legislative model, is based on the concept of "two-end strengthening and tripartite balance," and legislation strengthens the protection of personal sensitive information and the use of personal general information. The Draft Recommendation stipulates that information subjects have the right to inquire and correct personal information, and stipulates the principle of "special protection of sensitive personal information." For the protection of sensitive information such as personal health information, the Draft Recommendation stipulates that information controllers shall take measures to specifically protect the sensitive information of information subjects, must not collect sensitive information, and specially remind information subjects when collecting sensitive information.

In the absence of China's personal information protection legislation, the formulation of a unified "Personal Information Protection Law" is more in line with China's legislative tradition and reality. For more sensitive personal health information, special rules may be formulated in the Personal Information Protection Law for special protection on the basis of Zhang Xinbao and Ge Xin's draft proposals. Under the framework of the Personal Information Protection Law, specific rules for the protection of personal health information may be gradually formulated, and comprehensive protection may be implemented for the circulation process such as the collection, processing, and preservation of personal health information.

4.2. Expand the Scope of Legal Interest Protection for Information Subjects. From the above analysis, it can be seen that the establishment of the right to personal health information can expand the scope of legal protection of information subjects and realize the control of personal health

information by information subjects. The right to personal health information refers to the right of individuals to control and exclude infringement by others from the data formed by their own health status in accordance with the law. Clarify the right to personal health information. The subject of the right to personal health information directly points to the natural person, the object is the identifiable personal health information, and the content of the civil right determines the scope of legal interest protection of the right subject. Therefore, on the basis of clarifying the subject and object of the individual's right to health, further elaborating the content of their rights is conducive to clarifying the legitimate rights and interests enjoyed by the subject of health information and laying the foundation for the protection of personal health information.

4.2.1. The Right to Know Personal Health Information. The right to know personal health information is the basic right of the information subject, which means that the information subject has the right to know all information related to the collection, processing, and preservation of personal health information, including the identity of the health information collection controller, the purpose of collection and use, the scope of collection, the processing situation, and the information security protection measures.

4.2.2. Control of Personal Health Information. Personal health information control means that the information subject has the final right to make decisions on personal health information. Specifically, it includes the right to consent, the right to rectification, the right to erasure, and the right to block.

The right to consent is the most important right to reflect the information subject's control of personal health information, and through the consent of the information subject, it is decided whether others can collect, use, and disclose personal health information. At present, there are two main ways to realize the right of consent of individuals in the world: one is the opt-in mechanism; that is, only with the consent of the information subject, the information collection and user can collect and use personal health information, and through reasonable notification procedures, the information subject can withdraw its previous opinions at any time. The second is the opt-out mechanism. Personal health information may be collected and used as long as the individual does not explicitly refuse, but the information subject has the right to request the withdrawal of consent at any time. The former focuses on the explicit consent of personal health information collection and processing, which is conducive to safeguarding the legitimate rights and interests of information subjects. The latter constructs an implicit consent rule for the collection and processing of personal health information, which ensures the circulation of personal health, but is not conducive to the protection of the rights and interests of information subjects. Personal health information is more closely related to personal dignity and freedom, so out of the need to protect the

personal interests of information subjects, it is more appropriate to adopt a selective entry mechanism.

The right to rectification refers to the right of the information subject to request the information processor to correct or supplement the health information in the event that it finds that its personal health information is incorrect and incomplete or other quality defects. In the era of big data, massive personal information constructs the possibility of data portraits, and "data people" appear in large numbers. Through the collection and integration of personal health information, a personal health profile can be constructed. In the case of flawed health information quality, there will be distortions and inaccuracies in the portraits, leading to discrimination. Giving the information subject the right to correct can ensure that the personal health profile is infinitely close to the true personality of the information subject. However, it should be noted that the information subject does not have the right to correct all health information. Personal health information includes not only personal statement information and medical staff record information, but also information objectively formed by medical testing instruments such as imaging examinations. The quality defects of the former can be found to be corrected. The latter is not the subject of the right to correct personal health information, unless there is an artificial correction or a purely incorrect entry.

The right to erasure means that when certain conditions are met, the information subject has the right to request the health information controller to delete his personal health information in a timely manner, such as the information subject withdraws his consent, the specific purpose cannot be achieved, and the information is illegally processed. However, Article 29 of China's "Provisions on the Administration of Medical Records of Medical Institutions" stipulates the time for medical institutions to keep medical record data. Although the law does not explicitly stipulate the electronic medical record, the provisions of the paper medical record also apply to the electronic medical record. In the case that personal health information is under the control of traditional medical institutions, the right to delete the information subject is restricted, and patients cannot require medical institutions to destroy their medical record data within the statutory time. Under the "Internet + medical" model, many online consultation institutions, such as Doctor Lilac, have the functions of both network service providers and medical platforms, and the "Medical Record Management Regulations for Medical Institutions" cannot be applied to such medical service providers, so the information subjects have the right to request such institutions to delete personal health information.

The right to block means that the information subject has the right to request the personal health information processor to temporarily stop or restrict the processing of health information when certain conditions are met. The right of blockade is mainly applicable to emergencies that endanger the legitimate rights and interests of health information subjects, and to fix health information in order to prevent the occurrence of damage consequences or further expand the damage consequences in a timely manner. Article 16 of

China's Regulations on the Handling of Medical Malpractice stipulates that patients and their close relatives shall enjoy the right to seal medical records after the occurrence of medical malpractice. Extended to the protection of health information, the right of information subjects to block has a legitimate basis in China.

4.2.3. The Right to Decide on Personal Health Information. The right to decide on personal health information means that the information subject enjoys the right to use personal health information autonomously according to his own wishes; that is, he or she decides how to use this information, including when and where to share which health information, and enjoys the right to access and carry.

The right of access means that the information subject has the right to inquire about personal health information and the processing of the information and obtain a copy. Compared with the right to know, the right of access can better promote the information subject to grasp the processing and utilization of personal health information after collection and is an important right to promote the participation of information subjects in the circulation of information. In practice, personal health information is secretly processed and used without the knowledge of the information subject, and the granting of access rights can to a certain extent supervise the information processing behavior of the information collection controller and narrow the information asymmetry between the information subject and the information controller.

The right to portability means that the information subject has the right to transfer the personal health information he previously provided to the information collection controller to other information controllers or to require the original information collection controller to transfer his personal health information directly to another controller. The right to carry can strengthen the follow-up control of personal health information by information subjects, and at the same time, the right to carry can significantly avoid the phenomenon of repeated collection of patients in different medical institutions, thereby reducing the number of personal health information collected and protecting personal health information from the source.

4.2.4. Right to Confidentiality of Personal Health Information. The right to confidentiality of personal health information refers to the right of information subjects to request that health information processors and controllers maintain the confidentiality of personal health information and must not illegally disclose their personal health information. Information subjects who wish to maintain the confidentiality of personal health information are core values of medicine and have been incorporated into the code of conduct for the medical profession. Medical institutions and medical personnel shall have the obligation to keep personal health information confidential based on medical ethics and laws and regulations, as shown in Figure 7.

The right to claim personal health information security is the right of the information subject to request the processor of personal health information to take necessary and reasonable protective measures, and also gives the information subject the right to file a lawsuit when the personal health information is infringed.

4.2.5. Derogation of the Right to Personal Health Information. Information subjects have rights to personal health information, but the rights are not absolute, and in specific cases, the right to personal health information should make appropriate concessions and compromises. Personal health information carries the public interest and has important use value in medical research, epidemic prevention, and control. Therefore, the derogation of the right to personal health information is mainly reflected in the conflict with the public interest.

Taking epidemic prevention and control as an example, the outbreak of new coronary pneumonia in China has been controlled through national efforts. After the outbreak of the epidemic, the relevant departments carried out timely collection and analysis and utilization of the health information of new crown patients, and gradually updated the patient diagnosis and treatment plan, effectively saving the lives of more patients. Therefore, in the face of conflicts between the right to personal health information and the public interest, the protection of individual rights should be conceded to the use of public welfare. However, this does not mean that personal health information can be disclosed and used arbitrarily based on public welfare purposes, and out of the practical needs of the public interest, the disclosure and use of personal health information should comply with the principle of proportionality, the content should be really necessary, in line with the public welfare purpose, and the means of disclosure should be reasonable and appropriate.

4.3. Enhanced Protection of Personal Health Information. By establishing the form of protection for information subjects to enjoy personal health information rights, the scope of legal interest protection of information subjects can be directly and comprehensively defined. However, there are inherent structural defects in simply granting the right to personal health information to information subjects: (1) the rights of information subjects cannot be effectively exercised. Under the process of medical informatization, the collection and processing of personal health information can be completed covertly and quickly in the virtual space, and once it is separated from the information subject, the information subject basically loses the defector control and control over personal health information. Therefore, although the right to personal health information is given to the information subject, the right holder cannot actually control the personal information, and the rights are difficult to protect. In addition, the protection of rights requires clear remedies for rights, and the most important means of remedy lie in the determination and assumption of tort liability. The rights protection model cannot provide clear compliance guidelines and behavioral expectations for counterparts and cannot provide a clear basis for judging the illegality of tort law. (2) The scope of legal interest protection
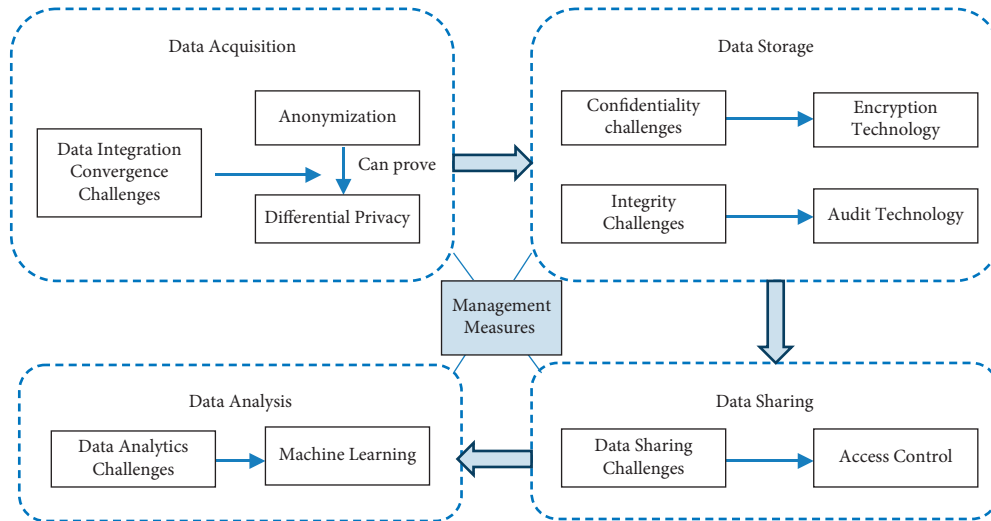
FIGURE 7: The privacy protection model of medical big data in the whole life cycle.

of personal health information and general personal information by information subjects: the difference is small, and it is difficult to achieve special protection of personal health information. By drawing on the special protection of health information by the European Union and the USA, it is found that both countries are proceeding from the code of conduct of information collection controllers, strictly limiting the collection and processing of personal health information by information collection controllers, so as to achieve the differential protection of personal health information and general personal information. Therefore, China should strictly limit the behavior of information collectors and users, and strengthen the protection of personal health information.

4.4. Improve Civil Remedy Mechanisms for the Protection of Personal Health Information. No remedy means no right. In order to ensure the realization of the right to personal health information, an effective infringement relief mechanism must be established. China's relevant legislation focuses on the administrative responsibility and criminal responsibility of the responsible subject and lacks a civil relief mechanism after the infringement of personal health information, which promotes the fluke psychology of health information collection and control, and there are a large number of infringements that do not yet constitute administrative punishment and criminal standards. Therefore, improving the civil relief mechanism can increase the illegal cost of information collection and processors, and at the same time promote the active protection of health information subjects.

4.4.1. Improvement of Tort Liability for Infringement of Personal Health Information Rights

(1) Determine the Principle of Attribution for Infringement of the Right to Personal Health Information. The principle of fault liability is a general principle in the attribution

system, and the principle of presumption of fault and the principle of no-fault liability are applied only in statutory circumstances. If the principle of fault liability is adopted, in the face of the infringement of personal health information, the information subject needs to produce evidence to prove the fault of the infringer. Under the background of the era of medical informatization, the information subject is in a weak position, the status of the information subject and the information collection controller is seriously unbalanced, and there is a big difference in the evidentiary ability of the two sides, so the burden of proof required the information subject is too harsh. In judicial practice, for the sake of protecting personal information, the principle of attribution of responsibility in personal information infringement cases has changed to the principle of presumption of fault, such as the "Pang Lipeng *v*. China Eastern Airlines Co., Ltd. and Beijing Quna Information Technology Co., Ltd. Privacy Dispute Case," in which the court collected evidence between Pang Lipeng and the defendant company. Considering the extreme asymmetry of ability, it is believed that the law should not require Pang Lipeng to prove that it must be the defendant company that leaked its private information, but that the defendant company should produce evidence to prove that it is not at fault. Since neither company had proven that the disclosure was attributed to other causes, the court found that the two companies were at fault, excluding the possibility of other disclosures of private information. From the perspective of legal provisions, Article 58 of the Tort Liability Law stipulates the principle of presumption of fault in medical damage. Therefore, as sensitive information in personal information, it is feasible to apply the principle of presumption of fault in China.

(2) Determine the Constituent Elements of Tort Liability. It is generally believed that the constituent elements of tort liability include the fact of damage, the illegal act, the causal relationship between the illegal act and the fact of damage,

and the fault of the perpetrator. For the infringement of personal health information, the illegal acts include two types: acting or not doing. As an act that refers to the perpetrator's initiative to infringe on the right to personal health information of others, it is manifested as an irregular act of collecting, using, and processing, and violating the code of conduct. Inaction refers to the noncooperation of the perpetrator when he or she fails to fulfill his obligation to ensure the safety and security of personal health information and when the information subject exercises the right to correct or block the right, although he or she has not taken the initiative to commit the harmful act. Even if the principle of presumption of fault is stipulated to be adopted for infringement of personal health information, the establishment of tort liability must also meet the fault element, which is only a matter of the allocation of the burden of proof. Due to the prevalence and harmful nature of personal health information infringement, the fact that the composition of personal health information infringement liability requires damage has not yet been determined. The first reading draft of China's Draft Civil Code stipulates that medical institutions and medical personnel who leak patients' personal information and cause damage to patients shall bear tort liability. The second and third reading drafts of the Draft Civil Code delete the provision of "causing harm to patients" and adopt strict liability for the establishment of personal health information infringement, without damaging the facts. Although the Deliberation Draft restricts the infringing subjects and infringements of personal health information, based on the consideration of legislative consistency, the author believes that the constituent elements of personal health information infringement liability do not include the fact of damage, and as long as the perpetrator commits the illegal act and is at fault, the actor should bear the tort liability.

(3) Determine How to Bear Tort Liability. According to the provisions of the Tort Liability Law, the methods of bearing the infringement of the personal health information rights of information subjects include nonproperty bearing methods and property bearing methods. Among them, the way to bear nonproperty tort liability mainly includes stopping infringement, removing obstacles, eliminating impacts, etc., such as stopping the collection and processing of personal health information. The property liability method includes property damage compensation and moral damage compensation. The property value and personality value of personal health information provide the basis for the right holder to claim property damages and moral damages. In personal health information infringement cases, the amount of property damages is difficult to calculate, and the author believes that the amount of compensation can be determined according to the order of compensation for "property loses of information subjects—improper benefits obtained by infringers—statutory compensation." The determination of compensation for moral damages may be determined from the perspective of a "rational person" on the basis of the degree of connection between personal health information and personal dignity.

4.5. Introduction of Public Interest Litigation. In the context of medical informatization, cases of infringement of personal health information occur frequently, often on a large scale and in a wide range. Due to the high cost of maintaining rights, many infringed information subjects in practice have not sought judicial remedies. In order to effectively safeguard the lawful rights and interests of information subjects, consideration may be given to introducing the public interest litigation system in the Civil Procedure Law into cases of infringement of personal health information.

Personal health information is of a public interest nature. Researchers in the medical field can promote the development and advancement of medicine by collecting, analyzing, and using personal health information. The improvement of diagnosis and treatment technology and the research and preparation of medical drugs require the use of personal health information. With the help of a large amount of personal health information, the state can carry out public health data monitoring and effectively analyze the health status of the whole people. In practice, a large number of personal health information are used for public welfare, and the public welfare of personal health information is prominent. Therefore, personal health information not only involves the personal interests of information subjects, but also involves the public interest. Public interest litigation mainly targets acts that infringe on the societal public interest, which shows that the introduction of public interest litigation to protect personal health information is reasonable.

In the medical information environment, it is more difficult for individual information subjects to protect their rights. The status, economic strength, and technical ability of health information subjects and information controllers are unequal, and it is difficult for information subjects to effectively safeguard their rights. In addition, information controllers often use personal health information on a large scale, and the number of infringed entities is large and scattered. These characteristics are similar to environmental public interest litigation and consumer public interest litigation. Public interest litigation is litigated on behalf of public interest organizations or corresponding state organs, which can effectively make up for the inequality between information subjects and information controllers, reduce the litigation costs of information subjects, and save judicial resources.

Public interest litigation has the functions of supervision and prevention and protection. Individual information subjects usually become aware of the infringement of their right to personal health information after the damage has occurred, while public interest organizations and personnel are able to detect the illegal conduct of the information controller before the damage occurs. Therefore, the introduction of the public interest litigation system is conducive to solving the problem of personal health information protection from the source.

Personal health information reflects the physiological and mental health conditions of information subjects, and can construct a personal health profile, which contains higher personality value and economic value. With the continuous construction and development of medical informatization, there are problems such as improper collection, improper disclosure, improper use, improper preservation, and other

problems of personal health information, the means of infringement continue to escalate, and a large number of cases of infringement of personal health information have emerged. In the dual vortex of big data and risk society, the protection of personal health information is encountering unprecedented problems. Whether it is a unified legislative model based on the right to information self-determination, a decentralized legislative and infringement protection model based on privacy rights, or an industry self-discipline model based on professional ethics, it is impossible to fully respond to the risks faced by personal health information in the big data environment. At present, risk regulation measures that have achieved initial results in areas such as environmental protection and food safety are a good prescription for dealing with the risks of personal health information. Due to the theoretical obstacles encountered by individual responsibility in dealing with risk regulation issues, the use of administrative law methods that are good at collective governance has become an inevitable requirement. The construction of an administrative regulatory system for personal health information risks must closely focus on the two basic issues of science and legitimacy.

5. Conclusion

In the dual vortex of big data and risk society, the protection of personal health information is encountering unprecedented problems. Whether it is a unified legislative model based on the right to information self-determination, a decentralized legislative and infringement protection model based on privacy rights, or an industry self-discipline model based on professional ethics, it is impossible to fully respond to the risks faced by personal health information in the big data environment. At present, risk regulation measures that have achieved initial results in areas such as environmental protection and food safety are a good prescription for dealing with the risks of personal health information.

Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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Research Article

Relationship between Financial Asset Allocation, Leverage Ratio, and Risk-Taking of Small- and Medium-Sized Enterprises in China: Taking Environment-Related Industries as an Example

Qing Chen [ID]

School of Economics and Management, Yiwu Industrial and Commercial College, Yiwu 322000, China

Correspondence should be addressed to Qing Chen; ywicchenqing@126.com

With the improvement of environmental policies and industry requirements for enterprise production and management, small-and medium-sized enterprises in environment-related industries were also changing. It was known from the existing research that the investment allocation of assets of small- and medium-sized enterprises was closely related to risk and return, and the leverage ratio of enterprises affected the risk-taking level of enterprises. In the process of sustainable development, enterprises will inevitably bear certain risks, but excessive risk-taking will bring all kinds of uncertainty and bankruptcy risk to the expected income and future cash flow of enterprises. Therefore, taking small- and medium-sized enterprises in environment-related industries as an example, this paper put forward relevant assumptions by analyzing the interaction between the existing enterprise financial asset allocation, risk-taking level and leverage ratio. In order to facilitate empirical analysis, A-share listed companies in environment-related industries in Shanghai and Shenzhen stock exchanges, small- and medium-sized board and GEM listed companies in Shenzhen stock exchange from 2007 to 2019 were selected as research samples. These data came from the information open platform for small- and medium-sized enterprises in environment-related industries, the research reports of third-party consulting companies and CSMAR and Wind databases. The empirical results showed that the allocation of financial assets had a significant impact on the level of risk-taking, and there was a *U*-shaped relationship between them when other conditions remained unchanged. At the same time, the financial asset allocation of small- and medium-sized enterprises in Chinese environment-related industries had a significant impact on the enterprise leverage ratio. Under other conditions unchanged, there was a *U*-shaped relationship between the two. In addition, leverage played an intermediary role in the relationship between financial asset allocation and risk-taking level. In addition to directly affecting the allocation of financial assets, it can also indirectly affect the risk-taking level of enterprises through leverage ratio.

1. Introduction

As an important part of the Chinese economy, small- and medium-sized enterprises play an important role in increasing government revenue and national income, stabilizing employment, and stimulating economic vitality. However, due to the reallocation of resources, the competition between related industries and the lack of government supervision over enterprises, some small- and medium-sized enterprises discharge pollutants at will, which has brought certain harm to the surrounding and world environment, resulting in social criticism of enterprises related to the

environmental industry [1]. At present, Chinese economic development has entered a new normal. Under the influence of macro policies and cyclical fluctuations, enterprises related to the environmental industry are affected by factors such as rising raw material prices and increasing labor costs. The development of the main business of most enterprises slows down or even stagnates, and the profits deviate from the balance of supply and demand. With the increasing requirements of countries around the world for enterprises related to the environmental industry, the risk-taking level of small- and medium-sized enterprises related to the environmental industry continues to decline, and the survival

time and survival rate of small- and medium-sized enterprises continue to decline. Therefore, the risk control and undertaking of nonfinancial enterprises have attracted much attention. On the contrary, the profit margin of the financial market represented by stocks and funds is much higher than the average profit margin of the real estate industry [2]. Therefore, in order to pursue a higher return on investment, the operators of small- and medium-sized enterprises related to the environmental industry began to allocate financial assets, from traditional stocks, bonds, funds to credit loans, purchase financial products, invest in financial institutions, and so on. Enterprise financial investment has become a hot trend, and small- and medium-sized enterprises are no exception. At the same time, Chinese small- and medium-sized enterprises related to the environmental industry have been facing the problem of high enterprise leverage [3]. The so-called enterprise leverage refers to the use of debt and a small amount of capital to leverage a large number of assets, so as to expand production and investment activities. From the relationship between the company's capital structure and the company's leverage ratio which is actually the asset liability ratio, which can be expressed by the ratio of total liabilities to total assets. It reflects the conflict of interest and optimal adjustment between shareholders and creditors and affects the normal sustainable operation of the enterprise to a certain extent. The change of asset investment allocation increases the uncertainty of investment income, and the change of enterprise leverage ratio will inevitably affect the risk-taking level of enterprises.

Through the data investigation and comparative study of enterprises in environment-related industries, such as textile and real estate, it is found that among the enterprises that choose to invest in financial products, some enterprises optimize the investment structure and increase the company's profits by allocating financial assets [4]. However, in the face of the temptation of a high-yield virtual economy, some nonfinancial enterprises invest in high-risk and high-yield financial assets, resulting in the deterioration of their financial situation. Therefore, the problem of how financial asset investment affects enterprise leverage and risk-taking has attracted the extensive attention of relevant scholars at home and abroad. Although risk-taking is an inevitable requirement for enterprises to obtain profits and returns, too high enterprise risk-taking will also increase the overvaluation of their expected income, increase the uncertainty of long-term cash flow. And expose them to bankruptcy risk. Therefore, taking enterprises in environment-related industries as an example, this paper successively analyzed various factors that may affect the development of small- and medium-sized enterprises, such as financial asset allocation, enterprise leverage, and risk-taking level, and put forward relevant assumptions on this basis. Through the research on the relationship between financial asset allocation, enterprise leverage, and risk-taking level of small- and medium-sized enterprises, this paper used empirical analysis to explore the main factors affecting the development of enterprises related to environmental industry.

2. Related Works

For enterprises in environment-related industries, the change of enterprise leverage ratio is usually reflected in the dynamic adjustment process of the enterprise capital structure. The earliest research comes from the theory of enterprise capital structure, which mainly studies the financing behavior of enterprises. For the long-term and high-quality development of enterprises, financing is essential, and there have been early capital structure theory, modern capital structure theory, new capital structure theory, and related applications. In the monitoring of the enterprise leverage ratio, some scholars evaluate the enterprise leverage ratio through the ratio between total liabilities and total assets from a micro perspective, or use the asset liability ratio to measure the enterprise leverage ratio [5]. Others use the ratio between short-term corporate liabilities and current assets to represent the enterprise leverage ratio, or use the ratio between the current loan amount and the total assets at the beginning of the period to calculate the enterprise leverage ratio. Other scholars use the ratio of short-term liabilities to total assets to measure the leverage ratio of enterprises.

Some scholars have studied the influencing factors of enterprise risk-taking related to environmental industries from the aspects of monetary policy and the nature of enterprise ownership. Some people have studied environment-related small- and medium-sized enterprises from the perspective of the impact of monetary policy, and found that there is a positive correlation between enterprise leverage and risk-taking, while monetary policy has an asymmetry on enterprise risk-taking, which can jointly affect enterprise risk-taking [6]. With the tightening of the national monetary policy, the risk bearing capacity of enterprises will be reduced, and there will be asymmetric effects between different enterprises and industries to a certain extent. For example, monetary policy has a transmission effect on enterprise risk assessment and management and is affected by certain economic cycle fluctuations. The rise of interest rates caused by monetary policy is easy to promote the increase of high-risk loans and debt risk. In addition, in view of the relationship between the nature of ownership and enterprise risk-taking, some scholars have found that the risk-taking degree of non-state-owned enterprises is lower than that of state-owned holding enterprises, and the enterprise risk-taking degree presents an inverted U-shaped relationship with the separation of control and management rights [7]. Compared with non-state-owned enterprises, state-owned small- and medium-sized enterprises have a more effective inhibitory effect on the level of risk-taking.

In recent years, some people have explored the impact of corporate management and board governance in environment-related industries on corporate risk-taking. The research shows that the enterprise management shareholding higher than the threshold will increase the enterprise risk-taking level. The relationship between professional managers and enterprise risk-taking is related to the incentive level of enterprises. Giving managers a certain proportion of equity can reduce the company's risk, while the management

shareholding of the enterprise is too high or too low, and the risk bearing level is very high [8]. After managers get an equity incentive, they will improve the company's performance and increase the company's risk-taking, and then the stock price will rise. With the increase of managers' shareholding, in order to pursue a high return, they are more inclined to invest in high-risk projects. The manager's shareholding will make him averse to high-risk, so the risk-taking level of the company will be reduced. After empirical analysis of multinational data, some scholars found that there is a positive correlation between enterprise risk-taking and the degree of state protection of its investors. The share transfer right will increase the company's risk-taking, and the shareholding level and scale of the board of directors are negatively correlated with the company's risk-taking. There is a significant positive correlation between the number of independent directors and the shareholding ratio of the board of directors and corporate risk-taking [9]. Generally, there is a positive correlation between the number of shareholders and the level of risk-taking, and there is a positive correlation between the independence of the board of directors and the risk-taking of the company. Private equity ownership has a positive impact on the company's risk-taking. Some scholars have found that there is a significant negative correlation between agency cost and risk-taking. In addition, there is a positive correlation between managers' overconfidence and enterprise risk-taking.

3. Related Theories and Research Hypothesis Design

3.1. Correlation Theory

3.1.1. The Relationship between Financial Asset Allocation and Enterprise Risk-Taking.
In view of the relationship between enterprise performance and enterprise risk-taking in environment-related fields, generally, enterprises with a high risk-taking level are often accompanied by large capital investment expenditure, which is also the key to the normal operation and development of enterprises. Research shows that companies with a high risk-taking level usually have higher $R \& D$ investment and innovation enthusiasm, and the company is more competitive [10]. Risk-taking by enterprises can help enterprises grow and improve corporate performance, and risk can also significantly enhance corporate value to a certain extent. Generally, there is a U-shaped, inverted U-shaped or positive correlation between enterprise performance and risk-taking; that is, the higher the level of risk-taking, the higher the enterprise value and capital allocation efficiency.

Due to the particularity of environment-related industries, for the relationship between executive compensation and enterprise risk-taking in environment-related fields, executive compensation incentives may be negatively correlated with enterprise risk-taking. Previous studies have shown that the stock option incentives of enterprise executives in environment-related fields will increase corporate risk, and there is a positive correlation between executive compensation, stock price sensitivity, and return volatility

[11]. Therefore, increasing executive compensation can inhibit the negative impact of free cash flow on enterprise risk-taking. There is a positive correlation between enterprise risk-taking and executive compensation in environment-related fields, a negative correlation with enterprise scale, a negative correlation with equity concentration, a positive correlation with the shareholding ratio of management, and a significant positive correlation with the asset liability ratio of the company.

Affected by the limited resources of environmental industries, enterprises need to make full use of scarce resources to maximize profits and need to coordinate and reasonably allocate among major industries and financial assets. Therefore, the allocation of financial assets is to meet the basic asset allocation requirements of not putting eggs in the same basket. From the research on the impact of financial asset allocation on relevant factors of enterprises, it is known that financial asset allocation may increase the risk bearing of enterprises to a certain extent, which is not conducive to the long-term development of enterprises [12]. For example, financial asset investment not only has a significant negative effect on the investment rate of enterprises in environment-related fields, but also the degree of financial investment is directly related to the level of risk-taking. However, because the allocation of financial assets can play the role of "reservoir" to a certain extent, it can appropriately reduce the risk of enterprises. Some scholars have found that the allocation of financial assets can adjust the cyclical fluctuation of enterprise income, make the asset structure more reasonable, and reduce the financing risk of enterprises [13]. Relevant studies have shown that financial asset investment can inhibit enterprises' risk-taking to a certain extent, but driven by dividends in the Chinese financial market, enterprises usually increase their investment in risky financial assets under the influence of short-term high returns. Because the enterprise's capital is fixed, the allocation of financial assets may affect the enterprise's risk-taking. The allocation of financial assets will inevitably reduce the working capital in the enterprise budget, which will affect the uncertainty of operating income and the risk bearing of the enterprise.

3.1.2. The Relationship between Financial Asset Allocation and Corporate Leverage Ratio.
According to existing research, the influencing factors of enterprise leverage in environment-related industries mainly include macro and micro levels. From the macro level, the overall economic prosperity and recession affect the credit level, thus affecting the leverage ratio of enterprises. Improving the capital utilization ratio can reduce the debt ratio of enterprises. The nature of enterprises is different, and their sensitivity to macroeconomic changes is also different, resulting in different levels of leverage. Different levels of leverage lead to different sensitivity to the macro economy. In different stages of economic development, the leverage ratio shows different trends at the micro and macro levels [14]. Therefore, economic expectations are different, and the state's control of leverage is also different. From the micro

perspective, the impact of leverage mainly includes the change of debt ratio, the adjustment direction of industrial structure, productivity, and inflation. The CEO has a great influence on the leverage ratio of the company. Payable income tax and individual income tax have a certain impact on enterprise leverage. Through the research of dynamic panel data and system generalized moment model, some scholars know that financial investment can reduce the leverage ratio of listed companies, but it is not suitable for nonlisted companies. The adoption of financial financing by enterprises often leads to excessive dependence on high leverage, aggravating the actual capital structure and deviating from the goal. At the same time, leverage has a certain impact on enterprises, the economy, and finance. For the impact of leverage on enterprise management performance, the company's leverage ratio has a significant negative correlation with operating performance, which means that reducing leverage ratio can help to improve operating performance, and appropriate liabilities can promote the company's operating performance. For the impact of leverage on enterprise investment, the high leverage of enterprises has seriously inhibited enterprise investment, so it must be deleveraged. In addition, leverage also has a certain impact on the economy and finance [15]. For example, there is usually an upper limit on corporate debt. Exceeding this limit will hinder the improvement of enterprise productivity and inhibit economic growth when corporate debt exceeds 90%. At the same time, a too high leverage ratio will also expand the impact on the financial system and reduce financial stability.

Similar to the relationship between financial asset allocation and enterprise risk-taking level, according to the existing research, the relationship between financial asset allocation and enterprise leverage is mainly reflected in two aspects: (1) financial asset allocation inhibits the rise of enterprise leverage. The increase in the share of financial assets will inhibit the leverage ratio of enterprises. The share of financial assets plays the role of "reservoir," which is an effective way for small- and medium-sized enterprises to deal with the shortage of funds and solve the urgent need [16]. There is a significant negative correlation between the share of financial assets, the profitability of financial channels, and the leverage ratio of enterprises, and the allocation of financial assets is expected to prevent risks. There is a nonlinear relationship between overall financial investment and enterprise leverage. The leverage ratio at both ends of the financial asset allocation structure is higher than that in the middle region. The level of financial investment can inhibit financial risks. At present, the financial leverage of listed nonfinancial enterprises in China is inversely proportional to the degree of financial investment. (2) The allocation of financial assets intensifies the financial risk of enterprises and improves the leverage ratio of enterprises. Under the downward pressure of the economy, the profitability of entity enterprises related to the environmental industry continued to decline due to the impact of macro policies and cyclical fluctuations. However, financial asset dividends stimulate the financial asset allocation of small- and medium-sized enterprises [17]. Entrepreneurs' profit-

seeking psychology enables them to increase debt financing and increase enterprise leverage to obtain high profits and returns. The improvement of the profitability of financial channels has significantly improved the leverage ratio of enterprises. Special attention should be paid to the risk of enterprises relying too much on financial investment profits. The research data show that the allocation of financial resources is unreasonable. Enterprises with low asset turnover and a growth rate of small- and medium-sized enterprises have more financial asset allocation, which leads to a sharp rise in the overall leverage ratio of enterprises [18]. Excessive debt and sustained negative profits will increase the role of financial asset allocation in improving leverage and weaken the inhibition of leverage.

3.1.3. The Relationship between Corporate Leverage Ratio and Risk-Taking. At present, the relationship between leverage ratio and risk-taking level is mostly studied from the perspective of the banking industry. Generally speaking, the capital level is inversely proportional to the bank's risk-taking ability. As a policy management tool, the leverage ratio plays an important role in reducing bank financial risks [19]. The enterprise leverage ratio, that is, the enterprise asset liability ratio, is the ratio of enterprise debt financing to total assets. It measures the financial risk level of enterprises to a certain extent. Through borrowing, enterprises can alleviate the shortage of funds required for investment. The uncertainty of investment is the premise for enterprises to improve their risk-taking level. It is known from the existing research results that through enterprise deleveraging, the risk-taking ability of enterprises can be significantly improved, which has a far greater impact on small- and medium-sized enterprises than on large enterprises. The capital structure of listed enterprises in environment-related industries has a significant positive impact on the level of risk-taking. The higher the asset liability ratio, the lower the risk bearing level of the enterprise. Short-term debt helps to improve the risk-taking level of enterprises, and the deleveraging of nonfinancial enterprises has a U-shaped relationship with risk-taking. Deleveraging of companies with a high asset liability ratio will reduce their risk-taking, while deleveraging of companies with less debt will increase their risk-taking [20]. In highly leveraged companies, entrepreneurs prefer high-risk projects to a certain extent. They will also choose high-yield and high-risk projects by borrowing funds, so as to increase the risk-taking of enterprises. From the above research on the relationship between financial asset allocation and enterprise risk-taking, enterprise leverage, and enterprise investment in financial assets, it is known that although financial asset allocation bears the risks brought by financial asset allocation, it also enjoys the benefits brought by financial asset allocation. Financial investment can weaken financial risk-taking by reducing leverage.

3.2. Research Hypothesis Design and Empirical Route. From the research results of small- and medium-sized enterprises in environment-related industries in terms of

financial asset allocation, risk-taking ability, and leverage ratio, it is known that there is a certain internal relationship between them. In order to further explore the correlation between them, this paper puts forward the following research hypotheses:

Hypothesis 1. The allocation of corporate financial assets has a significant impact on the level of risk-taking, and when other conditions remain unchanged, there is a *U*-shaped relationship between the two.

Hypothesis 2. The financial asset allocation of enterprises has a significant impact on the leverage ratio of enterprises. And when other conditions remain unchanged, there is a *U*-shaped relationship between the two.

Hypothesis 3. Corporate leverage ratio plays a mediating role in the impact of financial asset allocation on the level of corporate risk-taking.

In order to test the above research hypotheses, this paper designs the following research route for empirical analysis and evaluates the relevant propositions, as shown in Figure 1.

4. Relevant Index Definition and Model Construction

4.1. Relevant Index Definition

4.1.1. Explained Variable. Enterprise risk-taking (Risk) is mainly measured by the volatility of corporate earnings, the annual volatility of stock returns, the maximum and minimum difference in return on assets, the possibility of enterprise survival, and tolerance for corporate failure. For comprehensive consideration, this paper uses the standard deviation of return on assets (*ROA*) in the three-year rolling window period to measure the volatility of enterprise income. In order to avoid the interference of industry heterogeneity on the results, it is necessary to adjust the *ROA* of each enterprise to the industry average *ROA*, that is, the enterprise *ROA* minus the industry average *ROA* to obtain the adjusted return on assets (*adjROA*). Finally, the enterprise risk-taking index is obtained by calculating the standard deviation of *adjROA* in the three-year rolling window period. The calculation formula is as follows:

$$\text{Risk}_{i,t} = \sqrt{\frac{1}{T-1} \sum_{t=1}^{T} \left(\text{adj}ROA_{i,t} - \frac{1}{T} \sum_{t=1}^{T} \text{adj}ROA_{i,t} \right)^2}, \quad (1)$$

where *T* is the rolling window length, *i* represents the specific *i* th enterprise, and *t* denotes the number of year during the observation period, its value range is 1–3.

4.1.2. Explanatory Variable. Financial asset investment of enterprises is expressed in *fin*. The proportion of the sum of financial monetary funds, trading financial assets, financial derivatives, available for sale financial assets, held to maturity investment, entrusted loans and financial products,

and long-term equity investment in the total assets of the enterprise is taken as the proxy variable of the enterprise's financial investment behavior. The larger the index, the greater the proportion of investment in financial assets.

4.1.3. Mediating Variable. As an intermediary variable, enterprise leverage ratio (*Lev*) is mainly measured by asset liability ratio, and its value can be expressed as total liabilities/total assets.

4.1.4. Control Variable. It is known from the existing research that the following indicators can usually be used as control variables: enterprise size (*Size*), operation period (*Age*), growth capacity (*Growth*), and initial profitability (*ROA*). In order to describe the macro level, the following indicators can be used as control variables: GDP growth rate (*GDP*), social financing scale growth rate (*Social*), annual dummy variable (*Year*), and industry dummy variable (*IND*).

The specific variable definitions are shown in Table 1.

4.2. Model Construction. Because there is a certain internal relationship between the enterprise's risk-taking model and the enterprise's leverage ratio; that is, the current situation is affected by the previous results, and the expected dynamic panel deviation, growth ability, and profitability make the control variables such as sales growth rate prone to endogenous problems. Therefore, based on existing research, this paper uses the system generalized moment estimation model (GMM) to study the relationship between financial asset allocation, leverage ratio, and risk-taking of small- and medium-sized enterprises [21].

In order to verify the correctness of hypothesis 1, combined with relevant data analysis, the regression method can be used to test the relationship between financial asset allocation and the risk-taking level of small- and medium-sized enterprises. The model is as follows:

$$\text{Risk}_{i,t} = \alpha_0 + \alpha_1 \text{Risk}_{i,t-1} + \alpha_2 \text{Fin}_{i,t} + \sum \alpha_i Z_{i,t} + \varepsilon_{i,t}, \quad (2)$$

$$\text{Risk}_{i,t} = \beta_0 + \beta_1 \text{Risk}_{i,t-1} + \beta_2 \text{Fin}_{i,t}^2 + \beta_3 \text{Fin}_{i,t} + \sum \beta_i Z_{i,t} + \varepsilon_{i,t}. \quad (3)$$

If hypothesis 1 is true, that is, when other conditions remain unchanged, the financial asset allocation of small- and medium-sized enterprises is positively correlated with the level of risk-taking, then the coefficient β_2 of $\text{Fin}_{i,t}^2$ should be positive.

Similarly, in order to prove the correctness of hypothesis 2, this paper uses the following model to test the relationship between financial asset allocation and enterprise leverage:

$$\text{Lev}_{i,t} = \gamma_0 + \gamma_1 \text{Lev}_{i,t-1} + \gamma_2 \text{Fin}_{i,t} + \sum \gamma_i Z_{i,t} + \varepsilon_{i,t}, \quad (4)$$

$$\text{Lev}_{i,t} = \delta_0 + \delta_1 \text{Lev}_{i,t-1} + \delta_2 \text{Fin}_{i,t}^2 + \delta_3 \text{Fin}_{i,t} + \sum \delta_i Z_{i,t} + \varepsilon_{i,t}. \quad (5)$$
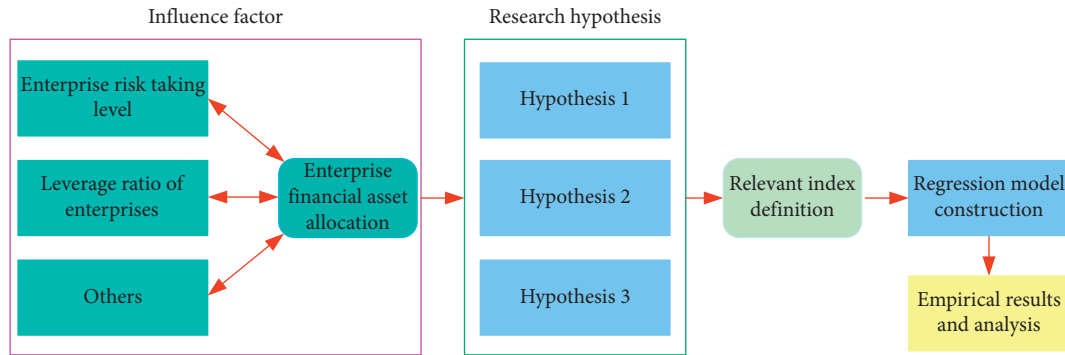
FIGURE 1: Schematic diagram of relevant proposition design and empirical test scheme.

TABLE 1: Variable definition, symbols, and descriptions.

Variable definition	Variable name	Symbol	Definition
Explained variable	Enterprise risk-taking	Risk	Standard deviation of three-year rolling enterprise return on assets
Mediating variable	Leverage ratio	Lev	Gross liabilities/total assets
Explanatory variable	Financial assets investment	Fin	The proportion of the sum of the trading financial assets seven items in the balance sheet to the total assets of the enterprise
	Enterprise scale	Size	Natural logarithm in total assets
	Operating years	Age	Natural logarithm of years of establishment plus 1
	Growth ability	Growth	Revenue growth rate
	Initial profitability	ROA	The earnings before interest and tax/total assets
Control variable	GDP growth	Gdp	GDP growth
	Growth in the scale of social financing	Social	Growth in the scale of social financing
	Industry	IND	Industry dummy variable
	Annual	Year	Annual dummy variable

If hypothesis 2 is true, that is, under other conditions unchanged, the financial asset allocation of small- and medium-sized enterprises is positively correlated with the enterprise leverage ratio, then the coefficient δ_2 of $\mathrm{Fin}_{i,t}^2$ should be positive.

In order to prove the correctness of hypothesis 3, this paper uses the following model to test the mediation effect:

$$
\begin{aligned}
Y &= cX + \varepsilon_1, \\
M &= aX + \varepsilon_2, \\
Y &= c'X + bM + \varepsilon_3,
\end{aligned}
\tag{6}
$$

where X, M, and Y represent three different variables respectively. c is the total effect of X on Y, a is the effect of X on M, b is the effect of M on Y, ab is the intermediate effect, and c' is the direct effect. The relationship between the effect coefficients is: $c = c' + ab$.

In order to describe the intermediary effect of leverage, this paper uses the intermediary effect model to study the relationship between different variables. The model is as follows:

$$
\mathrm{Risk}_{i,t} = \theta_0 + \theta_1 \mathrm{Risk}_{i,t-1} + \theta_2 \mathrm{Fin}_{i,t} + \theta_3 \mathrm{Lev}_{i,t} + \sum \theta_i Z_{i,t} + \varepsilon_{i,t}.
\tag{7}
$$

According to models (1), (3), and (5), the intermediary effect of leverage ratio needs to meet the following conditions: (1) Enterprise risk-taking and financial asset allocation are regressed, and the regression coefficient α_2 reaches a significant level. (2) The enterprise leverage ratio and financial asset allocation are regressed, and the regression coefficient γ_2 is significant. (3) The level of enterprise risk-taking regresses simultaneously with the financial asset investment and leverage ratio, and the coefficient of the intermediate variable θ_3 is significant. When the coefficient of financial asset investment θ_2 is not significant, the leverage ratio exerts a full mediation effect. When θ_2 is significant, the leverage ratio exerts a partial mediation effect.

5. Demonstration and Analysis

5.1. Sample Selection.
This study selects A-share listed companies in Shanghai and Shenzhen stock markets, small- and medium-sized boards, and GEM listed companies in the Shenzhen Stock Exchange from 2007 to 2019 as research samples. Figure 2 shows the annual distribution of IPO of sample enterprises in environment-related industries. These data mainly come from the information open platform for small- and medium-sized enterprises in environment-related industries, the research reports of third-party consulting companies, and CSMAR and Wind databases. The macro data for GDP and CPI come from the National
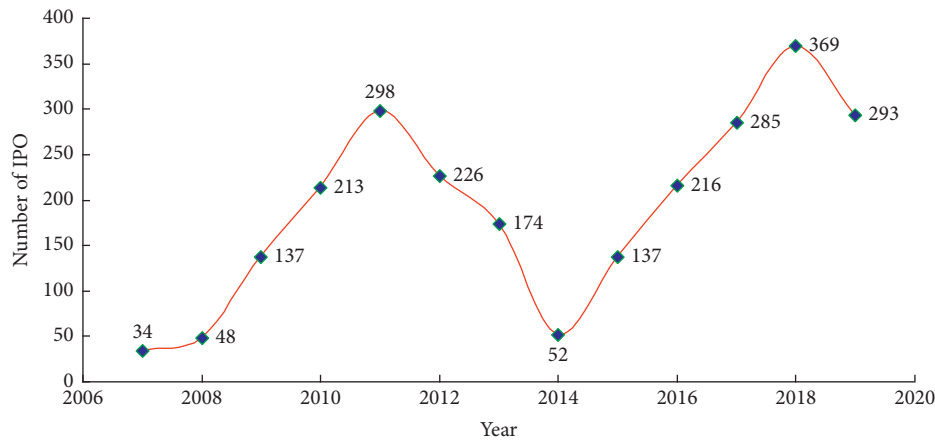
FIGURE 2: Annual distribution of IPO of sample enterprises in environment-related industries.

Bureau of Statistics, the Ministry of Finance, the People's Bank of China and other departments. The selected data does not include large enterprises, financial and real estate companies, ST or PT companies, samples with incomplete data and missing data for three consecutive years, and companies with significant financial anomalies. Finally, STATA 16.0 and SPSS 22.0 are used to process the characteristic data of small- and medium-sized enterprises in environment-related industries while avoiding the interference of outliers.

5.2. Data Description and Statistics. The descriptive statistics of the main variables are shown in Table 2. It can be seen from Table 2 that the standard deviation of the enterprise risk-taking level (*Risk*) is 1.9062, the minimum value is 0.0020, and the maximum value is 95.6825, which shows that the risk-taking levels of different companies in different years are obviously different. The maximum value of financial asset allocation is 0.5012, and the minimum value is 0.0000. From the proportion of the financial asset allocation of a single enterprise in the finance of the whole enterprise, we can know that there are great differences in the financial asset allocation of enterprises in different years. The average leverage ratio of enterprises is 0.4526, and the maximum value is 0.9422, which reflects that the leverage ratio of Chinese enterprises is too high, and there are great differences among different enterprises related to the environmental industry.

For each explanatory variable in Table 1, we adopt the Pearson correlation coefficient test. The testing results are shown in Table 3. According to the statistical results, the correlation coefficient between most explanatory variables is small, indicating that there is no deep multicollinearity between explanatory variables. Therefore, the multiple regression method can be used to further analyze the relationship between them. Therefore, it can be determined that the model settings are correct. The correlation coefficient between financial asset allocation, leverage ratio, and enterprise risk-taking is small and positive, indicating that there is a positive correlation between them and there is not much linear correlation. This indicates that there may be a

nonlinear relationship between them, which verifies the hypothesis of a nonlinear relationship between variables in hypothesis 1 and hypothesis 2, but the exact relationship needs to be further verified by the regression results. The analysis of the correlation coefficient of each variable shows that the variance expansion factor is far less than the threshold of 10, which further explains the rationality of the model.

In addition, we can get the change trend of risk-taking level and leverage ratio of sample enterprises in environment-related industries in the five years before and after IPO from 2008 to 2018, as shown in Figure 3. Among them, the risk-taking level shows an increasing trend, while the change in leverage ratio is relatively stable.

5.3. Regression Result Analysis. The specific regression results of the dynamic panel systematic generalized method of moments are shown in Tables 4 and 5. GMM estimation has a one-step method and a two-step method. The two-step method has parameters and excessive dependence on the standard deviation, so the results are biased downward and inaccurate. Although the one-step estimation method has low regression efficiency, it can ensure the consistency of estimation. Therefore, the one-step method is mostly used in practical applications.

The empirical results show that the change of enterprise risk-taking level (*L. Risk*) lagging for a period is significantly positively correlated with the current risk-taking level, which reflects the stickiness of the risk-taking level of small- and medium-sized enterprises related to the environmental industry in China.

By comparing the regression results and hypotheses, we find that the square coefficient (*Fin²*) of financial asset allocation in model (3) is 0.4513, which is significantly positive at the level of 1%. It confirms the research hypothesis H1: the allocation of corporate financial assets has a significant impact on the level of risk-taking, and when other conditions remain unchanged, there is a *U*-shaped relationship between the two. According to the parameter estimation results of model (5), the square coefficient (Lev²) of the enterprise leverage ratio is significantly positive at the

TABLE 2: Descriptive statistics of main variables.

Variable	Observed value	Mean	Standard deviation	Minimum value	Maximum value
Risk	38522	1.8533	1.9062	0.0020	95.6825
Lev	33195	0.4526	0.1988	0.0493	0.9422
Fin	33195	0.0497	0.0875	0.0000	0.4873
Size	36512	25.6994	0.7062	21.6354	28.6231
Age	39536	13.5326	6.2282	2.0000	32.0000
Growth	31562	0.1953	0.4169	-0.3864	2.1478
ROA	36512	9.6846	8.9695	-14.9156	44.6982
Gdp	37892	8.6167	2.1326	6.6000	14.2000
Social	37892	15.6895	30.6523	-13.9654	98.8864

TABLE 3: The Pearson correlation coefficient matrix of the variable.

	Risk	Lev	Fin^2	Fin	Size	Age	Growth	Roa	Gdp	Social
Risk	1.000									
Lev	0.033***	1.000								
Fin^2	0.236***	−0.023**	1.000							
Fin	0.227***	−0.016**	0.956***	1.000						
Size	−0.036***	0.195***	0.031***	0.297***	1.000					
Age	−0.008*	0.264***	0.226***	0.037***	0.315***	1.000				
Growth	−0.013*	−0.075***	−0.069***	0.028***	−0.019***	0.320***	1.000			
Roa	0.026***	−0.162***	−0.153***	−0.306**	−0.362***	−0.019***	−0.096***	1.000		
Gdp	0.029***	−0.019**	−0.014**	0.135***	−0.226***	−0.356***	0.068***	0.165***	1.000	
Social	0.021***	−0.003	−0.002	0.086***	−0.126***	−0.235***	−0.010*	−0.095***	0.365***	1.000

Notes. *, **, *** mean significant at the level of 10%, 5% and 1% respectively.
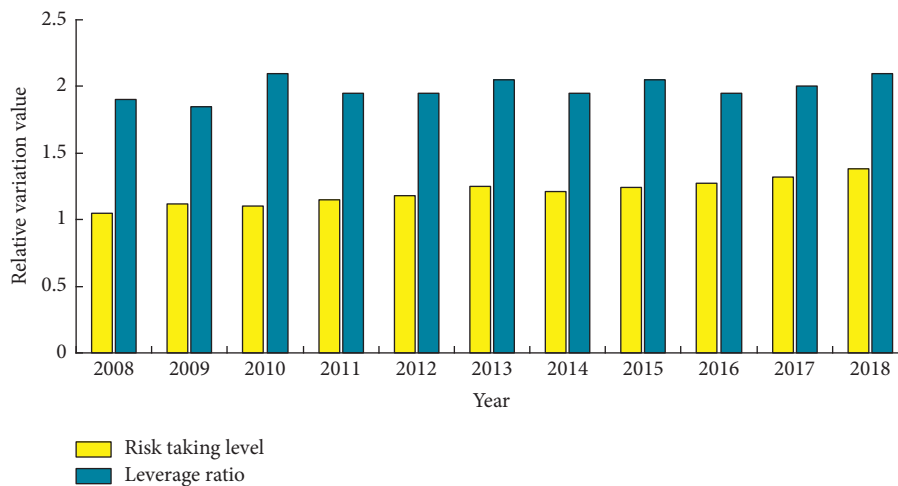
FIGURE 3: Change trend of risk-taking level and leverage ratio of sample enterprises in environment-related industries in the five years before and after IPO.

level of 1%, which supports the research hypothesis 2. The financial asset allocation of enterprises has a significant impact on the leverage ratio of enterprises. And when other conditions remain unchanged, there is a U-shaped relationship between the two. In model (7), the coefficients of financial asset allocation share (Fin) and corporate leverage ratio (Lev) are both significantly positive at the level of 5%, which confirms hypothesis 3. It illustrates that corporate leverage ratio plays a mediating role in the impact of financial asset allocation on the level of corporate risk-taking. Financial asset allocation not only exerts direct influence on

enterprise risk-taking but also exerts indirect influence through the adjustment of the leverage ratio.

5.4. Robustness Test. In order to test the robustness of the above regression results, by changing the calculation method of risk, this paper uses the difference between the maximum and minimum of the three-year rolling window length of the environmental industry adjusted return on assets (adjROA) to measure the enterprise's risk-taking level, which is recorded as Risk$_2$. The results obtained by regression

Table 4: The estimation results of system GMM.

Variable	Risk Model (2)	Risk Model (3)	Lev Model (4)	Lev Model (5)	Risk Model (7)
L.lev			0.8236*** (0.012)	0.8137*** (0.014)	
L.Risk	0.1384*** (0.043)	0.1431*** (0.041)			0.1265*** (0.040)
Lev					0.0832** (0.036)
Fin	0.2746** (0.126)		0.1062*** (0.034)		0.1894** (0.095)
Fin²		0.4513*** (0.134)			
Lev²				0.7956*** (0.023)	
Size	−0.1186*** (0.139)	−0.1231*** (0.167)	−0.0265*** (0.093)	−0.0289*** (0.101)	0.1102** (0.046)
Age	0.0162** (0.007)	0.0234** (0.011)	0.0017** (0.001)	0.0019** (0.003)	0.0134** (0.006)
Growth	0.1326** (0.062)	0.1452** (0.049)	0.0058*** (0.007)	0.0062*** (0.009)	0.1107** (0.052)
Roa	−0.0029 (0.002)	−0.0042 (0.003)	−0.00036*** (0.000)	−0.00039*** (0.001)	−0.0025 (0.002)
Gdp	0.0186*** (0.006)	0.0192*** (0.011)	−0.0042*** (0.001)	−0.0046*** (0.002)	0.0203*** (0.007)
Social	0.0006*** (0.000)	0.0009*** (0.000)	0.0001** (0.000)	0.0003** (0.000)	0.0006*** (0.000)
Constant term	2.2286*** (0.796)	3.1256*** (0.8023)	0.6439*** (0.089)	0.7726*** (0.093)	1.9011*** (0.650)

Notes. Standard error in parentheses; *, **, *** mean significant at the level of 10%, 5%, and 1%, respectively.

Table 5: Robustness test to change the estimation method of risk-taking.

Variable	Risk2 Model (2)	Risk2 Model (3)	Lev Model (4)	Lev Model (5)	Risk2 Model (7)
L. lev			0.8236*** (0.012)	0.8137*** (0.014)	
L. Risk	0.1384*** (0.043)	0.1431*** (0.041)			0.1289*** (0.040)
Lev					0.0816** (0.036)
Fin	0.2746** (0.126)		0.1062*** (0.034)		0.2136** (0.095)
Fin²		0.4513*** (0.134)			
Lev²				0.7956*** (0.023)	
Size	−0.1186*** (0.139)	−0.1231*** (0.167)	−0.0265*** (0.093)	−0.0289*** (0.101)	−0.1023** (0.046)
Age	0.0162** (0.007)	0.0234** (0.011)	0.0017** (0.001)	0.0019** (0.003)	0.0022** (0.006)
Growth	0.1326** (0.062)	0.1452** (0.049)	0.0058*** (0.007)	0.0062*** (0.009)	0.0996** (0.052)
Roa	−0.0029 (0.002)	−0.0042 (0.003)	−0.00036*** (0.000)	−0.00039*** (0.001)	−0.0023*** (0.002)
Gdp	0.0186*** (0.006)	0.0192*** (0.011)	−0.0042*** (0.001)	−0.0046*** (0.002)	0.0189*** (0.007)
Social	0.0006*** (0.000)	0.0009*** (0.000)	0.0001** (0.000)	0.0003** (0.000)	0.0006*** (0.000)
Constant term	2.2286*** (0.796)	3.1256*** (0.8023)	0.6439*** (0.089)	0.7726*** (0.093)	1.8865*** (0.695)

Notes. Standard error in parentheses; *, **, *** mean significant at the level of 10%, 5%, and 1%, respectively.

Table 6: Robustness test of mediating effect of leverage ratio.

Dependent variable	Sobel test value		Bootstrap (95%) confidence interval	
	Z value	The effect proportion (%)	Upper limit	Lower limit
Risk	5.866***	53.62	0.0012	0.0233
Risk₂	5.838***	61.23	0.0015	0.0245

Notes. *** mean significant at the level of 1%.

estimation are shown in Table 5. It can be seen from Table 5 that the test and analysis results obtained by using the model constructed in this paper are basically consistent, which reflects that the established model has good robustness.

In addition, the Sobel test and the Bootstrap method are used to test the robustness of the intermediary effect of the company's leverage ratio. The regression estimation results are shown in Table 6. When taking risk-taking as the explanatory variable, the Z value of the Sobel test is significantly positive, which confirms the significant existence of an intermediary effect, accounting for 53.62%. In the test results using the Bootstrap method, the confidence interval of the indirect effect does not include 0, so the intermediary effect is significant. Therefore, by changing the measurement method of the explained variable, Risk₂ is basically consistent with the previous risk estimation, indicating that the model has good robustness.

6. Conclusion

Affected by various factors, such as environmental policies and industry requirements for enterprise development, the allocation of financial assets of small- and medium-sized enterprises related to environmental industry in China had a significant impact on the level of risk-taking. Under other conditions unchanged, there was a U-shaped relationship between them. When the allocation ratio of financial assets was in the middle position, it mainly acted as a reservoir and restricted the risk-taking to a certain extent. However, if the ratio is too low or too high, giving up profits and speculative profits will increase the

risk-taking level of enterprises. At the same time, the financial asset allocation of small- and medium-sized enterprises related to the Chinese environmental industry had a significant impact on the enterprise leverage ratio. Under other conditions unchanged, there was a U-shaped relationship between the two. Leverage ratio in an appropriate range was conducive to inhibit the risk-taking of enterprises, and too low or too high leverage ratio will promote the risk-taking of enterprises. In addition, the leverage ratio played an intermediary role in the relationship between the degree of financial investment and the level of risk-taking. In addition to the direct impact of financial asset allocation, it can also indirectly affect the risk-taking level of enterprises through leverage ratio. Through the empirical research on the financial asset allocation, enterprise leverage and risk-taking of enterprises related to environmental industry, this paper put forward the following suggestions: (1) Enterprises should reasonably allocate financial assets. Make use of the role of financial assets in solving the cash flow of enterprises and make the allocation of financial assets play the role of reservoir and risk prevention savings by increasing liquidity, so as to resist the fluctuations of macro policies and economic cycles. (2) Establish an enterprise risk control and early warning mechanism to maintain the enterprise leverage at a reasonable level and avoid relying on debt financing. (3) Government departments should continue to promote the smooth progress of supply side structural reform, prevent the hollowing out of assets, broaden enterprise financing channels, establish and improve the risk monitoring of enterprise departments under the national system, and remind enterprises to pay attention to the risks brought by macro policies and economic cycle fluctuations.

Data Availability

The labeled dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Acknowledgments

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Research Article

Environmental Affection-Driven English Tense Analysis: A Healthcare Exercise-Based Corpus Case Study over Public English Environment

Yiling Ding [1,2] **and Tianhua Wang** [1]

^{1}*Heilongjiang University, Harbin 150080, China*
^{2}*Harbin Normal University, Harbin 150080, China*

Correspondence should be addressed to Tianhua Wang; 1995027@hlju.edu.cn

Most international academic papers are written in English, and the use of tenses in English academic papers often follows some conventional rules. Automatically extracting and analyzing English tenses in scientific papers have begun to attract researchers' attention for the global environment. In the analysis of the English tense of scientific papers, consider that the neural network model that combines attention mechanism and sequential input network such as Long Short-Term Memory (LSTM) network has a long training time, low extraction accuracy, and cannot parallelize text input. We propose an environmental affection-driven English tense analysis model, which includes an attention mechanism and LSTM model and conducts a temporal analysis of English texts based on an affective computing model. In this paper, our proposed method is verified based on the self-built healthcare exercise-based corpus over public English environment. By comparison, the experimental results show that the method proposed in this paper has better performance than ordinary Convolutional Neural Network (CNN), Support Vector Machine (SVM), and LSTM based on attention mechanism.

1. Introduction

English tense (tense) is a verb form that expresses behavior, action, and state under various time conditions. It is a very basic and important grammar knowledge. Different tenses are used to express different times and ways of verbs. According to traditional grammar, there are 16 tenses in English. Specifically, there are four kinds of time: present, past, future, and past and future. There are also four kinds of action: general, ongoing, complete, and complete, and the combination of time and action will produce 16 tenses. English tenses involve every complete sentence and are widely and universally used. After comparing the expression forms of English and Chinese tenses, it is not difficult to find that English tenses are mostly reflected in grammatical forms, while Chinese use more function words or combinations of other words to express the concept of tenses,

lacking grammatical morphological changes, which makes English learners in China, including scientific and technological workers, have constant difficulties in the process of tense acquisition, learning and use, which is undoubtedly a great challenge for a new language knowledge [1, 2]. Most of the international academic papers are written in English. For the vast number of Chinese research paper researchers, the tense of English papers is both the key and the difficulty.

In recent years, researchers have introduced machine-learning methods into the fields of English tense analysis, English semantic understanding, multilingual tense conversion, and English-Chinese translation. However, these methods all belong to the category of shallow learning, and the function models and calculation methods are relatively simple, which makes them unable to express some complex functions with positive samples and calculation units, and the general ability is weak. At the same time, a large number

of data features need to be manually selected. These defects have caused machine-learning methods to encounter bottlenecks in this task. Deep learning can automatically learn important feature representations from raw data to handle various complex tasks and has obvious advantages in modeling, interpretation and expression capabilities, and optimization. Convolutional neural network (CNN) [3, 4] and recurrent neural expressive ability and optimization have obvious advantages. CNNs can extract localized structural information in data, while recurrent neural networks [5] can process serialized structural information. In recent years, there has also been a composite model combining the two model structures, which has achieved friendship effects in the field of English tense analysis. The attention mechanism is the latest achievement in the current deep learning field, which can capture the most representative features in the text and optimize the model structure [6–8].

Sentiment analysis, also known as opinion mining, refers to people's sentiments, opinions, evaluations, attitudes, and affections about services, products, organizations, individuals, issues, events, topics, and their attributes. Text sentiment analysis is a branch of sentiment analysis, whose purpose is to judge the speaker's sentiment toward things from the original text. Machine learning based methods can be applied in the field of sentiment analysis. The tendency calculation of text sentiment is helpful for the tense understanding and verification of scientific papers. Using environmental affection-driven analysis of English tenses in scientific papers can better understand and judge the accuracy of tense use. This paper considers including environmental affection analysis into English tense analysis, analyzes English tense based on environmental affection drive, proposes an English tense analysis method based on environmental affection drive, and evaluates it using a corpus based on healthcare exercise.

The main contributions of our paper can be summarized as follows: (1) An environmental affection-driven English tense analysis method is proposed, and the affective computing model is integrated into the English tense analysis framework to improve the system performance. (2) An attention mechanism is introduced, which can give more consideration to contextual temporal correlation, and the attention mechanism is integrated with the LSTM model to analyze the English tense. (3) The method proposed in this paper is compared with three types of popular methods, from the perspective of system performance and operating efficiency. The effectiveness of this method was evaluated.

This paper is organized as follows: Section 2 describes the related work. Section 3 details our method. Section 4 provides the evaluation results of our method. Section 5 concludes our paper at last.

2. Related Work

Murata [9, 10] used various machine-learning methods (K-proximity algorithm, decision table, maximum entropy, support vector machine) to deal with Japanese-English tense translation and found that support vector machine works best. Gong et al. [11] proposed an N-gram-based temporal translation model and synthesized it with a phrase-based statistical machine translation system. In this model, the tense of a certain verb in an English sentence is called intra-sentence tense, and the tense of a verb in the main clause of an English sentence is called inter tense. The respective N-gram models are trained by constructing an intra-sentence temporal sequence corpus and an inter-sentence temporal sequence corpus. Then, using these two N-gram models to correct the probability value of the translation result, the BLEU value increased from 28.30 to 28.92. However, the model does not utilize the information of temporal words, temporal adverbs, and temporal particles of Chinese sentences, and only uses the tense N-gram model to guess the possible temporal sequences.

In recent years, deep learning technology has made significant breakthroughs in text classification tasks, and many scholars have used deep learning technology to solve specific target sentiment analysis problems. Nguyen and Shirai [12] proposed a target-specific sentiment analysis model based on RNN and dependency tree. Dong et al. [13] proposed an adaptive RNN for the target-specific Twitter text sentiment classification task. These methods use deep learning technology to solve the problem of specific target sentiment analysis, which can better learn the sentiment feature information of text through deep neural network without the need for sentiment dictionary, and achieve better classification results than traditional machine learning methods. However, these methods need to use external knowledge such as dependency tree and syntactic relationship, and the network model structure is relatively complex. Ruder et al. [14] proposed a hierarchical bidirectional LSTM network for target-specific sentiment analysis. This method uses a bidirectional LSTM network to extract and learn features from the input text at different levels, which can effectively learn the internal relationship of sentences and the relationship between sentences. Therefore, the affective polarity of a specific target can be judged. However, the main disadvantage of the deep learning based methods is that they cost too much time on training. This limits the application. In this paper, we introduce an environmental affective computing model and combine it with the deep learning technology to analyze the English tense.

3. Our Method

The topological relationship between words is crucial for text temporal analysis, and language models based on recurrent neural network (RNN) are more suitable for processing text sequence data. RNN consists of three modules, namely input layer, hidden layer, and output layer [15, 16]. In the RNN model, the temporal input layer and the temporal hidden layer are aggregated into a new input layer, which also serves as the hidden layer at time t. The recurrent structure of RNN enables the hidden layer to retain all the information in the previous words to improve the ability to recognize the sequential relationship between words [17, 18]. There are too many unrolled state layers in the back-propagation of the RNN model through the Temporal Optimization Algorithm

(BPTT), which causes the gradient of historical information to decay during training [19]. In this paper, LSTM is used to avoid the long-term dependence of the model on words, and its structure is shown in Figure 1. RNN with LSTM can be seen as an improved model of traditional RNN language model, which takes text sentences as input sequence to calculate the error of each model. But when the text sequence information is long, the RNN model with LSTM can effectively overcome the problem of sequence information decay [20]. Compared with traditional RNN language models, RNN with LSTM can fully cover longer sentences, and it performs well in multiple validation experiments, especially for English sentence structures with connectives.

The environmental affection-driven LSTM proposed in this paper introduces an attention mechanism and an environmental affection-driven computational model to improve performance, and the overall architecture is shown in Figure 1. There are six steps included in total, which are the following: environmental affection-driven computational model establishment, LSTM construction, attention mechanism inclusion, natural language inference instantiation, pooling and feature fusion, model training, and testing.

3.1. Environmental Affection-Driven Computational Models.

The propensity calculation of text sentiment [21, 22] is helpful for the temporal understanding and verification of scientific papers. In this paper, a sentiment-driven computational classification model S_{EPD} is established, namely: $S_{EPD} = \{E, P, D, C, G\}$. In the formula, E is the affective tendency set; P is the temporal affective feature set; D is the affective feature degree score set; $C: D \longrightarrow P$ is a surjective function; $G: C \longrightarrow E$ is also a surjective function.

E is the set of affective tendencies of scientific papers, and if affections are divided into m categories, then $E = \{e_1, e_2, \ldots, e_m\}$. P is a set of temporal affective features, and if there are n features, then $P = \{p_1, p_2, \ldots, p_n\}$. D is the set of degree scores of a sentence in the paper on each affective feature, namely $D = \{d_1, d_2, \ldots, d_n\}$. When k degree words d_w appear in the feature p_i in a sentence, then $d_i = \prod_{j=1}^{k} d\_w_j$.

$C: D \longrightarrow P$ is a surjective function connecting sentiment degree to feature, that is, $C(P) = d_i p_i$, $G: C \longrightarrow E$ is a surjective function connected by the degree of modified affection-to-affection inclination. The category of the final affective tendency is determined by the Softmax function:

$$f_i(E) = \frac{e^{E_j}}{\sum_{l=1}^{J} e^{E_l}} E.$$ (1)

3.2. LSTM Construction.

The LSTM model is used to deal with the problem of sequence labeling, which can make full use of the information of the entire text sequence, including the relationship information between each word, and use this information for the processing of each word [23, 24]. An LSTM model contains many LSTM cells, each LSTM cell contains an input gate, an output gate, a forget gate, and a memory cell [25, 26]. Let c represent the memory unit of the LSTM model, x the input gate of the LSTM model, f the

forgetting gate of the LSTM model, and h the output gate of the LSTM model. Take the text local features $\{x_1, x_2, \ldots, x_m\}$ as input, take the t_{th} word as an example, activate the memory unit, and obtain the feature value of each state of the t_{th} LSTM unit. The word is as follows:

$$\tilde{F}_{c_t} = \text{rec}\left(W_{xc}X_t + W_{hc}F_{h_{t-1}} + b_c\right),$$ (2)

$$F_{i_t} = \sigma\left(W_{xi}X_t + W_{hi}F_{h_{t-1}} + W_{ci}F_{c_{t-1}} + b_i\right),$$ (3)

$$F_{f_t} = \sigma\left(W_{xf}X_t + W_{hf}F_{h_{t-1}} + W_{cf}F_{c_{t-1}} + b_f\right),$$ (4)

$$F_{c_t} = F_{f_t} \odot F_{c_{t-1}} + F_{i_t} \odot \tilde{F}_{c_t},$$ (5)

$$F_{o_t} = \sigma\left(W_{xo}X_t + W_{ho}F_{h_{t-1}} + W_{co}F_{c_{t-1}} + b_o\right),$$ (6)

$$F_{h_t} = F_{o_t} \odot \tan h\left(F_{c_t}\right).$$ (7)

Among them, rec is the activation function; W represents the weight matrix of LSTM; b represents the bias vector of LSTM; σ is the sigmoid function; $\odot$ represents the pointwise product. Similarly, after building the reverse LSTM model, the output feature of each word of the bidirectional LSTM contains the information of the entire sentence.

3.3. Attention Mechanism Inclusion.

The attention probability is calculated using the attention mechanism [27, 28]. Attention probability can highlight the importance of a specific word to the whole sentence, and the introduction of attention mechanism considers more contextual temporal associations [29]. Therefore, the model needs to evaluate the importance of the information generated at different moments, thus introducing the attention mechanism.

In this paper, the state of each moment of the hidden layer output by the third layer is taken as the hidden state set $A = (a_M^1, a_M^2, \ldots, a_M^t)$, where a_M^T represents the state of hidden layer of the last layer of LSTM at the t_{th} moment, and using A as the input of the attention mechanism. We can calculate the degree $e_t^{t'}$ that the output sequence at time t needs to pay attention to the hidden state at time $t\prime$. $e_t^{t'}$ can be calculated by building a simple neural network, the network parameters are W_h and b_h, as shown in the following formula:

$$e_t^{t'} = \tanh\left(W_h\left[a_M^{t-1}, a_M^{t'}\right] + b_h\right).$$ (8)

After obtaining $e_t^{t'}$, the weight $\alpha_t^{t'}$ of which the output sequence at time t pay attention to hidden state at time t' can be calculated, as shown in the following formula. That is to find the proportion of the attention degree at time t' to the attention degree at all times.

$$\alpha_t^{t'} = \frac{\exp\left(e_t^{t'}\right)}{\sum \exp\left(e_t^{t'}\right)}.$$ (9)
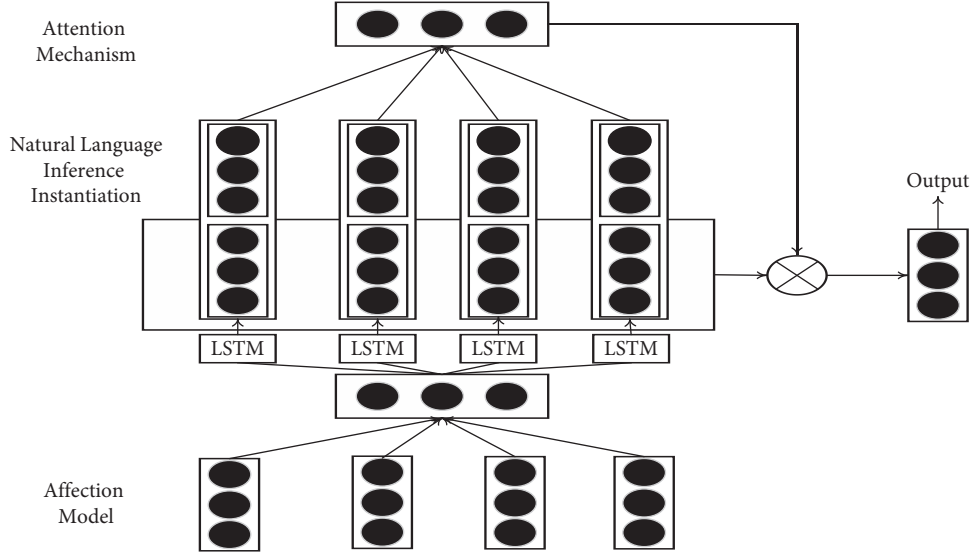
Figure 1: The overall framework of Our Method.

Therefore, the total weight factor r_t at time t is obtained as follows:

$$r_t = \sum \alpha_t^{'t} a_M^{'t}.\tag{10}$$

The final output of LSTM at time t is obtained as follows:

$$y_t = \text{LSTM}\left(r_t, a_{t-1}, c_{t-1}\right).\tag{11}$$

3.4. Natural Language Inference Instantiation.

The purpose of natural language inference (NLI) is to establish the semantic relationship between the premise sentence and the corresponding hypothesis sentence. A total of 32 sentences and their corresponding passive voice sentences are syntactically annotated. Following Bowman's standard procedure, two sentence encoding models are introduced in this paper, with binding parameters for premise sentences and hypothetical sentences respectively. Given the output codes s^p and s^h of the hypothetical premise, the relationship can be expressed as the concatenation of s^p, s^h, $s^p - s^h$ and $s^p \Leftrightarrow s^h$. This is fed into a 300D fully connected layer, which is then fed back into the three-unit output layer and Softmax for computing the probability distribution of the model's three relationships.

3.5. Pooling and Feature Fusion.

Pooling is to perform statistical calculation on the output results of the model, and use the maximum pooling method to pool the corresponding output features $F = \{F_1, F_2, \ldots, F_m\}$ after the attention mechanism is introduced to the entire sentence.

$$d = \text{Maximize}(F).\tag{12}$$

After pooling, the overall feature d of the text is obtained. Regardless of the length of the sentence, the feature dimension after pooling is fixed, which solves the problem of different lengths of text sentences.

Feature fusion is to fuse multiple features into one feature, which can achieve the effect of complementary advantages of multiple features. The local features of the text and the overall features of the text are fused to obtain a new feature F'; then the fused feature F' is imported into the classifier for relation classification, and the classification result $s(x)$ is output.

3.6. Model Training and Testing.

Similar to supervised machine learning methods, the dataset is divided into training data and test data. The model is then trained using the training data to learn the relevant parameters of the network. The relation classification problem is regarded as a multi-classification problem judgment. In order to obtain the optimal model, this paper conducts model training by minimizing the negative log-likelihood function. Assuming that the relationship label type $\mu \in T$ obtained from the target relationship is $s(x)$ after being processed by the classifier, T represents the relationship label, and is converted into a conditional probability after being processed by the classifier. The probability that the label type of the target relation y is μ is

$$p\left(y = \frac{\mu}{s(x)}, \theta\right) = \frac{\exp\ (s_\theta(x))_\mu}{\sum \exp\ (s_\theta(x))_i}.\tag{13}$$

The stochastic gradient descent algorithm is used to minimize the negative log-likelihood function, and the objective function $J(\theta)$ of the model optimization is calculated as follows:

$$J(\theta) = -\sum_{i=1}^{D} \log\left(p\left(y = \frac{y_i}{x_i}, \theta\right)\right).\tag{14}$$

Among them, $\theta = (W,\ U,\ V)$ represents the model trainable parameters; D represents the number of training samples; (x_i, y_i) represents that the relationship label corresponding to the i_{th} sample x_i in the training sample is y_i.
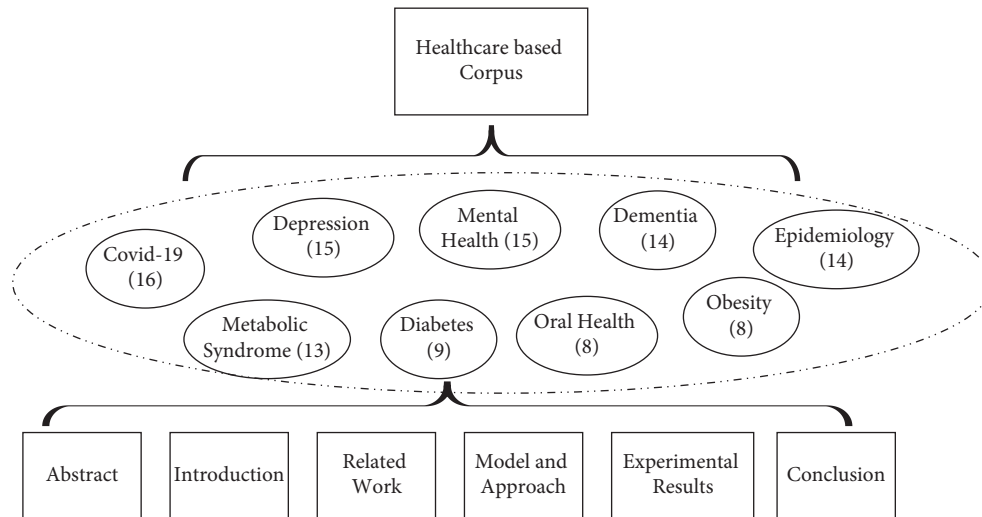
FIGURE 2: The structure of the healthcare exercise based corpus.

Next, test data is fed into the model to evaluate performance. Because of the limited size of the dataset, validation data is not used here. Meanwhile, since the system considers language-independent annotation schemes, K-fold validation can be used to improve the performance of the dataset.

4. Experimental Evaluation

4.1. Healthcare Exercise-Based Corpus. The method proposed in this paper requires an annotated language dataset, and in order to train, develop, train, and evaluate the system, a self-built healthcare exercise-based corpus case study is used. A corpus refers to a collection of corpus of a certain size that is specially collected for one or more applications, has a certain structure, and can be retrieved by a computer program [30]. The structural and representative characteristics of a corpus are often determined by the category information under the corpus. More specifically, the distribution of categories completely determines the characteristics of the corpus.

The self-built corpus in this paper mainly includes self-built book-type literature and self-built journal type literature. The author selects all medical and health papers from the SCI (American Science Citation Index) database, because the SCI database is the most widely used and highly recognized database in the world. It has good retrieval quality and includes a high level of journal. In China, the quantity and quality of papers included in SCI are also used as important indicators to evaluate the level of scientific research. In this paper, a total of 112 medical and health related scientific papers in nine categories are selected from more than a dozen international authoritative journals as research samples. The specific distribution is shown in Figure 2. Each circle represents a category of medical and health scientific research papers, which are the following: COVID-19 (16), Depression (15), Mental Health (15), Dementia (14), Epidemiology (14), Metabolic Syndrome (13), Diabetes (9), Oral Health (8), Obesity (8). The number of papers is in brackets. Each

scientific paper can be divided into six parts, namely: Abstract, Introduction, Related Work, Model and Approach, Experimental Results, Conclusion.

4.2. Evaluation Metrics. In this paper, three metrics which are *precision, recall,* and *F-score,* are used for evaluating model performance. They are calculated as follows:

$$\text{Precision} = \frac{TP}{TP + FP}, \tag{15}$$

$$\text{Recall} = \frac{TP}{TP + FN}, \tag{16}$$

$$F1 - \text{score} = \frac{2 \cdot \text{Precision} \cdot \text{Recall}}{\text{Precision} + \text{Recall}}. \tag{17}$$

Among them, TP is the number of correctly predicted samples as positive, FP is the number of wrongly predicted samples as positive (they are negative samples actually), and FN is the number of wrongly predicted samples as negative (they are positive samples actually).

4.3. Parameter Setting. The activation function of the model uses the rectified linear activation (ReLU) function, the number of hidden layer nodes is 300, and softmax is used as the classifier. In order to prevent the overfitting phenomenon in the model calculation process, the L2 regularization method is used to constrain the network parameters, and the dropout strategy is also introduced in the training process, and the dropout rate is set to 0.5. In addition, the batch Adadelta optimization method is used for model training, the batch size is taken as 50 (Refer to citation [31]), and the number of training rounds is taken as 500. Among them, the code loss rate and the number of training rounds are both obtained by fivefold cross-validation, and the validation set is randomly obtained from the training samples.

TABLE 1: The precision comparison of four algorithms.

	COVID-19	Depression	Mental health	Dementia	Epidemiology	Metabolic syndrome	Diabetes	Oral health	Obesity
Our method	88.49	89.29	90.60	90.18	91.84	92.92	93.72	92.14	90.80
AT-KSTN	85.26	84.79	85.12	86.09	84.28	85.48	84.54	83.78	86.36
CNN	82.49	83.46	82.98	81.87	80.13	79.19	77.68	76.68	77.19
SVM	77.99	76.94	77.04	79.39	81.92	83.29	78.89	78.76	78.40

TABLE 2: The recall comparison of four algorithms.

	COVID-19	Depression	Mental health	Dementia	Epidemiology	Metabolic syndrome	Diabetes	Oral health	Obesity
Our method	86.78	89.05	90.33	90.46	90.17	89.57	83.44	84.92	85.89
AT-KSTN	83.23	80.85	79.83	79.23	80.98	78.24	79.52	77.04	79.68
CNN	75.29	74.43	75.08	74.32	75.03	77.51	78.42	79.02	80.36
SVM	77.54	75.58	74.92	76.57	75.97	74.27	76.49	77.98	79.68

TABLE 3: The F1-score comparison of four algorithms.

	COVID-19	Depression	Mental health	Dementia	Epidemiology	Metabolic syndrome	Diabetes	Oral health	Obesity
Our method	87.63	89.17	90.46	90.32	91.00	91.22	88.28	88.39	88.28
AT-KSTN	84.23	82.77	82.39	82.52	82.60	81.70	81.95	80.27	82.88
CNN	78.73	78.69	78.84	77.92	77.50	78.34	78.05	77.84	78.74
SVM	77.76	76.25	75.97	77.96	78.83	78.52	77.67	78.37	79.03

4.4. Experimental Results. The method proposed in this paper is compared with the following three types of methods:

(1) *CNN*. Based on the convolutional neural network model proposed in the literature [32], it is the most basic convolutional neural network.

(2) *SVM*. The feature-based SVM classification model proposed in literature [33] achieves better classification results than previous studies.

(3) *AT-LSTM*. The LSTM network based on attention mechanism proposed by the literature [34], and this model achieves better classification effect than the traditional LSTM network in the sentiment classification of five specific targets.

The experiments are carried out on our self-built healthcare exercise based corpus to analyze the performance of the proposed method. The experimental results are shown in Tables 1–3.

We first compare the accuracy, recall, and *F*-value of four different methods on our self-built corpus. The horizontal axis corresponds to the different categories of the healthcare exercise corpus. It can be seen that the method proposed in this paper is better than the other three methods in terms of precision, recall, and F1 value. The performance of AT-LSTM is second, and the performance of CNN and SVM is similar, ranking last. At the same time, it can be seen from the tables that on different types of medical and health corpora, the performance of various methods is similar, and only fluctuates within the normal range.

Next, we compare the operating efficiency of the method proposed in this paper with CNN, SVM, and AT-LSTM. The experimental results are shown in Figures 3-4, where the
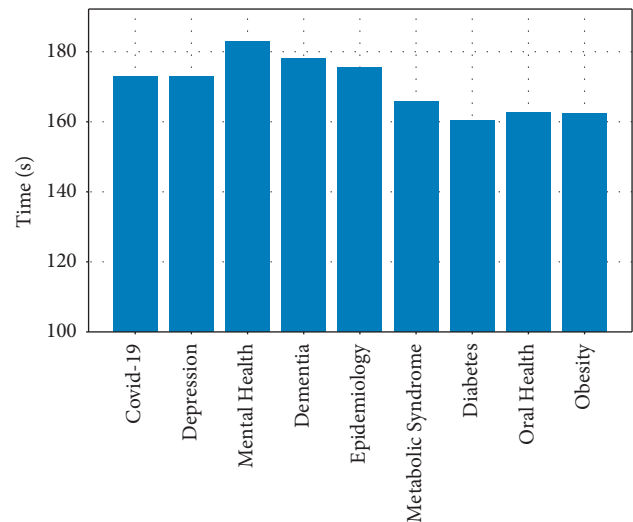
FIGURE 3: The training time of our method on each category of the corpus.

vertical axis represents the training time, the unit is in seconds. Figure 3 only shows the operating efficiency of the method proposed in this paper in different categories of medical and health corpora. It can be seen that the training time of different categories is similar, and there is no obvious difference.

The horizontal axis of Figure 4 represents the number of words. It can be seen from the experimental results that in general, the method proposed in this paper does not have an advantage in terms of training time, and its training time is slightly lower than that of AT-LSTM, but much higher than that of CNN and SVM. As the number of words increases, the training time will gradually increase. Considering that
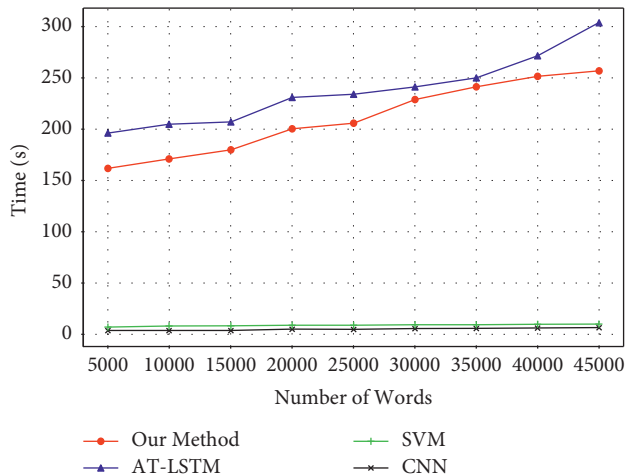
FIGURE 4: The training time comparison of four algorithms.

the training process can be carried out offline or implemented by a higher-performance computer, although the method proposed in this paper is much less efficient in training than CNN and SVM, from the perspective of performance advantages, the method in this paper is still significant. Better than the other three methods.

5. Conclusion

For the tense of English verbs, "time" includes "present," "past," "future," and "past future," "tense" includes "general," "perfect," "perform," and "perfect progression." There are 16 tenses in total. Most of the international academic papers are written in English. For the vast number of Chinese research paper researchers, the tense of English papers is both the key and the difficulty. Scientific papers can generally be divided into six parts: Abstract, Introduction, Related Work, Model and Approach, Experimental Results, and Conclusion, and their writing generally has a rigorous, objective, and refined scientific style. From a microscopic point of view, scientific papers must also present some regular language features, including tense, voice, and personal usage. In order to automatically extract and analyze English tenses in scientific and technological papers, this paper designs an English tense analysis based on environmental affection-driven analysis and integrates the computational model of sentiment analysis. In order to take the contextual temporal relevance into account, this paper introduces the attention mechanism and combines the attention mechanism with LSTM to realize the temporal analysis of scientific papers. In order to verify the method proposed in this paper, this paper selects 112 medical and health related scientific and technological papers as research samples to form a corpus to carry out experiments. Compared with conventional convolutional neural network, support vector machine and LSTM based on attention mechanism, the method proposed in this paper has advantages in precision, recall, and F1-score. The experimental results show that our method is significantly better than the other three methods. In the future, the larger and more

comprehensive corpus with automation technology should be considered to evaluate our method. Besides, the performance should be further improved for deployment for real cases.

Data Availability

All data used to support the findings of the study are included within this paper.

Conflicts of Interest

The authors declare that there are no conflicts of interest in this paper.

Acknowledgments

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Hindawi

Research Article

Spatial-Temporal Evolution and Influencing Factors of Urban Green Innovation Efficiency in China

Chengwu Lu,[1] Min Chen ⓘ,[2] and Guixian Tian[3]

[1]*School of Business, Zhejiang Wanli University, Ningbo, China*
[2]*School of Business, Wenzhou University, Wenzhou, China*
[3]*School of Business, Pingxiang University, Pingxiang, China*

Correspondence should be addressed to Min Chen; 00642005@wzu.edu.cn

Promoting green urban development has become a common consensus to address environmental pollution and ecological damage, but we know little about the measurement and drivers of urban green innovation efficiency (GIE). In this article, firstly, we established a framework for assessing urban green innovation efficiency through multidimensional data, then used the spatial econometric model to reveal the spatiotemporal evolutionary characteristics of urban GIE, and, finally, analyzed the influencing factors and spatial spillover effects of urban GIE. The results show the following: (1) The overall urban GIE in China was low and had significant spatial agglomeration, mainly concentrated in the Yangtze River Delta and Pearl River Delta regions with spatial locking characteristics, while the GIE of cities in undeveloped regions does not change much. (3) There was much room for improvement in the input-output system of green innovation, considering that the sources of inefficiency in most cities were insufficient investment in scientific and technological innovation personnel and innovation environment, excessive environmental pollution, and limited technological output. (4) Foreign direct investment, financial development, and manufacturing industry agglomeration had positive effects on urban GIE. These research findings and policy implications are of certain reference value for other emerging developing countries to implement urban governance and green development.

1. Introduction

Since the reform and opening up, China's urbanization has made remarkable achievements. The urbanization rate has increased from 17.9% in 1978 to 58.5% in 2017. It took China 40 years to go through the urbanization process on which the developed countries spent hundreds of years. However, the rapid urbanization has also brought great pressure to the ecological environment of the city, resulting in serious pollution problems [1, 2]. In order to solve these problems, the Chinese government has put forward the strategy of ecological civilization construction and green innovation development. Under the background of global green economic transformation, urban development has entered a new development mode driven by innovation and constrained by resources and environment [3, 4]. Therefore, improving the efficiency of green innovation is an important way to achieve the goal of global sustainable development.

So far, academia has not given a definition of green innovation that can be understood and widely accepted by the public. In general, the concept of green innovation (GI) is similar to that of the environmental innovation and ecological innovation. Green innovation usually refers to the adoption of new or improved processes, technologies, practices, systems, products, etc. by companies in order to reduce and avoid environmental damage [5, 6]. In a broad sense, green innovation also includes technological innovation, institutional innovation, and cultural innovation that promote sustainable economic, ecological, and social development [7–9]. Green innovation efficiency (GIE) refers to the performance in the development of green innovation. It is generally believed that GIE is to bring environmental benefits into the process of innovation input and output and obtain the optimal innovation output at the lowest cost of resources and environment [10, 11]. How to measure the efficiency of green innovation scientifically has been a hot

issue in environmental economics. Although many studies have used different methods to measure the GIE of enterprises and industries, how to measure the efficiency of urban green innovation has been stagnant. In addition, we still know little about the driving factors of urban GIE.

The efficiency of urban green innovation is closely related to the environmental regulation, human capital, industrial structure, financial development, and other factors, which may jointly affect and even determine the process of urban green innovation development to a certain extent [12, 13]. At the same time, since the knowledge spillover effect has the distance decay effect, the GIE of a city will be affected by the neighboring cities [14, 15]. Such knowledge spillover will affect the spatial distribution characteristics and evolution pattern of urban GIE and bring about a wider range of changes in the economic pattern. Therefore, it is necessary to explore the spatial-temporal characteristics and influencing factors of urban GIE. This paper takes the city as the research unit, and from the input-output perspective, it tries to (1) obtain the spatial-temporal evolution characteristics of GIE of Chinese cities; (2) analyze the sources of urban GIE inefficiency in terms of the structure of inputs and outputs; (3) understand how the environmental regulation, industrial agglomeration, financial development, and foreign direct investment affect the efficiency of urban GIE, and what the spatial spillover effect of these factors is.

Compared with the previous literature, the main contributions of this paper are as follows: First, we constructed a set of relatively perfect evaluation indicators of urban GIE and used the Undesirable-SBM model to measure the GIE of Chinese cities. Compared with the previous studies using a single indicator, it can measure the efficiency of green innovation more comprehensively. Second, from the perspective of spatial interaction, we used the spatial econometric model to explore the driving effect of environmental regulation, industrial agglomeration, financial development, and foreign direct investment on GIE, which enriches the theoretical research on the influencing factors of urban GIE. Third, the research methods and conclusions of this paper are of great enlightenment value for the urban environmental governance and urban sustainable development in other developing countries.

The remainder of this paper is structured as follows: The related literature on green is described in Section 2. In Section 3, we introduced the indicators of urban GIE assessment and described the variables and spatial econometric models for regression analysis. In Section 4, we reported the results of this paper. Our research focused on three parts: spatial and temporal variation characteristics of urban GIE in China, inefficiency decomposition of input-output indicators of urban GIE, driving factors, and spatial spillover effects of urban GIE. In Section 5, we summarized the main findings and discussed some potential avenues for further research.

2. Literature Review

As the world's environmental pollution constantly increases and the energy crisis intensifies, there is a consensus to promote the environmental improvement by increasing the level of green innovation. Since the 1990s, more and more research studies have focused on how to reduce negative environmental impacts through green innovation, and scholars from different disciplines have studied green innovation from different perspectives, such as environmental economics [16], innovation economics [17], and strategy management [18]. The relevant researches can be summarized as follows.

Green innovation efficiency measurement methods: in order to obtain more accurate evaluation results, the evaluation methods of GIE are also developing. There are many methods used in the existing research: (1) *Single Indicator Method*. It takes the output of green innovation as the index to measure the efficiency of green innovation. Among them, the commonly used index is the green patent [19, 20]. (2) *Comprehensive Indicator Method*. Green innovation activities involve a wide range, so a single index obviously cannot cover most of the green innovation factors. Therefore, much existing literature selected a number of indicators, from the green innovation input to environmental performance, to form a comprehensive evaluation index to measure the efficiency of green innovation [21, 22]. (3) *Input-output Analysis Method*. The most widely used methods are stochastic frontier analysis (SFA) and data envelopment analysis (DEA). In specific empirical studies, DEA and SFA mainly measure the GIE of industries and regions. For example, Fang et al. [23] used the nonradial distance function data envelopment analysis (DDF-DEA) to evaluate the green innovation efficiency of China's high pollution industries. Liu et al. [24] utilized SBM-DEA to measure the green innovation efficiency of China's high-tech industries. Lin et al. [25] used DEA window analysis to measure the green innovation efficiency of China's manufacturing industry. Long et al. [26] measured the efficiency of green innovation in 30 provinces of China through EPSi-based measurement (EBM) and Malmquist Luenberger.

(2) Influencing factors of green innovation efficiency: compared with the traditional innovation, the spillover effect of green innovation can achieve a "win-win" result with both economic development and environmental benefits [27]. Therefore, it is very important to explore the driving forces of green innovation, especially the differences between green innovation and traditional innovation [28, 29]. The existing research studies on the influencing factors of green innovation can be summarized in three aspects: (1) *Technological Innovation Capability*. The innovation capability of enterprises is an important factor to improve the innovation efficiency. However, relevant studies have found that because green innovation technology has the nature of public goods, enterprises with technological advantages generally tend to improve the traditional innovation efficiency rather than the GIE [30–32]. (2) *Market Demand Factors*. Consumer demand for environmentally friendly products and clean technologies is an important driving force for green innovation in enterprises [33, 34]. At present, the global market demand is moving towards low-pollution, low-energy products, and processes, and companies are paying more and more attention to providing green and low-carbon products and services to consumers. The development of environmental awareness is an

important driving force to promote the GIE. (3) *Institutional Factors.* Due to the negative externality of environmental problems, green innovation, as a public product, has a relatively weaker market driving force than the traditional innovation, which makes the environmental regulation one of the main factors of green innovation. "Porter Hypothesis" asserts that the environmental regulation will force enterprises to improve their green innovation ability, reduce environmental pollution, and improve their economic benefits [35]. For example, a large number of studies have pointed out that the role of environmental regulation in green innovation has the heterogeneity effect on industries, regions, and firms [36–38]. In addition, the organizational system, R&D investment, and management strategy also have an impact on the efficiency of green innovation [39, 40]. With the continuous development of spatial economics, the spatial autocorrelation of green innovation has gradually been paid attention to by empirical research [41–43], and relevant research studies have begun to use spatial econometric model to explore the impact of industrial structure, educational capacity, infrastructure, environmental policies, and other factors on GIE. For example, Luo and Zhang [44] found that the education level and maturity of technology market had significant positive correlation with regional GIE. Huang and Wang [45] showed that the improvement of transportation infrastructure could improve the efficiency of regional green innovation.

3. Methodology and Data

3.1. Methodology

3.1.1. Undesirable-SBM Model. Generally, there are two basic DEA models to measure the efficiency of green efficiency. One is the radial DEA model. But it has a disadvantage that it ignores the relaxation of input-output variables, which leads to errors in the estimation results. The other is the nonradial DEA model. It overcomes the shortcomings of the traditional radial DEA model and can measure the efficiency value more accurately, but it is difficult to calculate. This paper adopted the Undesirable-SBM model proposed by Tone [46] to measure the efficiency of urban GIE in China. The calculation formula is as follows:

$$\min p = \frac{1 - 1/m \sum_{i=1}^{m} Si_i^- / x_{i0}}{1 + 1/S_1 + S_2 \left(\sum_{r=1}^{S_1} S_r^g / y_{r0}^g + \sum_{r=1}^{S_2} S_r^b / y_{r0}^b \right)}, \quad (1)$$

$$\text{subject to} \begin{cases} x_0 = X\gamma + S^-, \\ y_0^g = Y^g \gamma - S^g, \\ y_0^b = Y^b \gamma - S^b, \\ S^- \geq 0, S^g \geq 0, S^b \geq 0, \end{cases} \quad (2)$$

In formula (2), p is the efficiency value, m, s_1, and s_2 respectively, represent the number of input variables, desirable output variables, and undesirable output variables; x_0, y_0^g, and y_0^b are the eigenvectors of input variables, desirable output variables, and undesirable output variables; X, Y^g, and Y^b are the relationship matrix of input variables, of desirable output variables, and undesirable output variables,

respectively; S^-, S^g, and S^b represent the relaxation of input variables, desirable output variables, and undesirable output variables in the Undesirable-SBM model; and γ is the weight matrix of the decision-making unit (DUM). The range of the efficiency value calculated by the undesirable-SBM model is $0 < p \leq 1$; only when $p = 1$, it indicates that the DMU is effective, otherwise, ineffective.

The advantage of the Undesirable-SBM model is that it cannot only measure the value of GIE of each DUM but also decompose whether the insufficient desirable output variables, the redundant input variable, or the undesirable output variables are the sources of the inefficiency of DUM. Therefore, it can provide direction for improving the efficiency of each DUM based on the input-output structure. In the objective function in formula (1), the three relaxation variables S^-, S^g, and S^b follow the decreasing law. When $S^- = S^g = S^b = 0$, the efficiency value $e = 1$ and the value of the model function reaches the optimal solution. When $e < 1$, it indicates that there is efficiency loss in the DUM. We decomposed the sources of inefficiency into the following functions:

$$\text{inefficiency source} = \begin{cases} \text{IE}_{\text{input}} = \dfrac{1}{2m} \sum_{i=1}^{m} \dfrac{Si_i^-}{x_{i0}}, \\[2ex] \text{IE}_{\text{output}} \dfrac{1}{S_1} \sum_{r=1}^{S_1} \dfrac{S_r^g}{y_{r0}^g}, \\[2ex] \text{IE}_{\text{bad−output}} \dfrac{1}{S_2} \sum_{r=1}^{S_2} \dfrac{S_r^b}{y_{r0}^b}, \end{cases} \quad (3)$$

Here, IE_{input} represents the inefficiency decomposition of input variables, $\text{IE}_{\text{output}}$ is the inefficiency decomposition of desirable output variables, and $\text{IE}_{\text{bad−output}}$ is the inefficient decomposition of undesirable output variables. The meaning of other variables is consistent with that in equation (1).

3.1.2. Spatial Autocorrelation Analysis. Tobler's first law of geography points out that the spatial autocorrelation of things is closely related to distance [47]. In order to explore the spatial characteristics of urban green innovation efficiency, this paper used Global Moran's I index and local Getis-Ord Gi * index in Exploratory Spatial Data Analysis [48] to analyze the spatial autocorrelation of GIE.

This paper used Global Moran's I index to explore the overall spatial autocorrelation of attribute values in the region, so as to judge the spatial agglomeration status of urban GIE.

$$\text{Moran's I} = \frac{n \sum_{i=1}^{n} \sum_{j=1}^{n} W_{ij} (X_i - \overline{X})(X_j - \overline{X})}{\sum (X_i - \overline{X}) \sum_{j=1}^{n} W_{ij}}, \quad (4)$$

Here, n is the sample size of the study. X_i and X_j are the GIE values of city i and city j, respectively, $\overline{X}$ is the average efficiency value of the sample, and W_{ij} is the spatial weight matrix between cities. In order to more accurately measure the distance decay characteristics of green innovation spillover, we used the reciprocal of geographical distance between cities as the spatial weight matrix.

We used the Getis-Ord Gi ∗ index to analyze the spatial heterogeneity of local regions. It can reflect the aggregation of regions of high or low values in space, so as to identify the hot and cold points with statistical significance.

$$G_i^*(d^2) = \frac{\sum_{j=1}^n W_{ij}X_j - \overline{X}\sum_{j=1}^n W_{ij}}{\sqrt{\sum_{j=1}^n X_j^2/n - \overline{X}^2}\sqrt{\left[n\sum_{j=1}^n W_{ij}^2 - \left(\sum_{j=1}^n W_{ij}\right)^2\right]/n-1}}, \quad (5)$$

where X_j is the GIE value of city j, W_{ij} is the spatial weight matrix, and $\overline{X}$ is the average value of GIE of all samples j.

3.1.3. Spatial Econometric Model.

In order to overcome the problem that the traditional econometric model ignores the spatial heterogeneity, this paper used the spatial econometric model to explore the influencing factors of urban GIE. Based on the research of Elhorst [49], this paper set up three spatial econometric models: Spatial Lag Model (SLM), Spatial Error Model (SEM), and Spatial Durbin Model (SDM). The corresponding model setting and spatial interaction effects of the three basic models are as follows.

Spatial Lag Model (SLM). The model setting is that the dependent variables are not only affected by their own explanatory variables, but also by the interregional explanatory variables.

$$Y_{it} = \rho \sum_{j=1}^n W_{ij}Y_{it} + \beta_k x_{it} + \mu_i + \gamma_{it} + \varepsilon_{it}. \quad (6)$$

Here, i represents the research unit, $i = 1, 2, 3, \ldots, N$, t is the research period, W_{ij} represents the spatial weight matrix, Y_{it} represents the dependent variable, ρ is the spatial autoregressive coefficient, x_{it} represents the independent variable, β_k is the coefficient of the corresponding independent variable regression, μ_i represents the spatial fixed effect, γ_{it} represents the time fixed effect, and ε_{it} is the error term.

Spatial Error Model (SEM). In the process of model setting, there is a spatial autocorrelation in the error term, that is, the error term in one space may have spatial spillover effect on the other regions.

$$Y_{it} = \beta_k x_{it} + \mu_i + \gamma_{it} + \varphi_{it}, \quad (7)$$

$$\varphi_{it} = \partial \sum_{j=1}^n W_{ij}\varphi_{it} + \varepsilon_{it}. \quad (8)$$

Here, φ_{it} is the error term of spatial autocorrelation and ∂ is the spatial autocorrelation regression coefficient of disturbance term.

Spatial Durbin Model (SDM). SLM and SEM could not explain the endogenous interaction effect or the spatial interaction effect with spatial autocorrelation error term. Therefore, Pace and Lesage thought that it could be further enhanced by using SDM.

$$Y_{it} = \rho \sum_{j=1}^n W_{ij}Y_{it} + \beta_k x_{it} + \sum_{j=1}^n W_{ij}x_{jt}\delta + \mu_i + \gamma_{it} + \varepsilon_{it}. \quad (9)$$

Here, δ is a parameter vector of k dimension and the meaning of the other parameters is consistent with that in formula (6).

3.2. Index System and Variables

3.2.1. Modified Evaluation Index of Urban GIE.

The biggest difference between green innovation and traditional innovation is that the former not only pursues economic benefits but also takes the environmental protection into account. Therefore, it is necessary to measure the efficiency of urban green innovation and introduce relevant variables of environmental pollution. We regarded the urban green innovation as an input-output process analysis and treated the environmental pollution as an undesirable output. Considering the availability and uniformity of data, the input-output index system we established is shown in Table 1.

(1) Green innovation inputs: according to the endogenous growth theory [50], innovation inputs generally contain the innovation capital, labor, and knowledge stock. Besides, since the innovation infrastructure is crucial for innovation, we also considered the innovation environment inputs, and in this paper, they are the cultural environment and the information network environment.

(2) Green innovation outputs: green innovation outputs include the direct technological outputs and economic effects brought by innovation. In the current literature, the green patent is the most widely used indicator to measure green innovation; the economic output is expressed in per capita GDP.

(3) Undesirable outputs: the environmental pollution is undesired in the green innovation process; therefore, we took the environmental pollutant emission of the city as the undesirable output index of green innovation. Based on the calculation method of Bai et al. [51], we assigned the industrial waste gas emission, industrial wastewater emission, and industrial fixed waste emission of the city with weights of 0.3, 0.4, and 0.3, respectively, and obtained the comprehensive environmental pollution index of the city through weighted calculation.

3.2.2. Influential Factors on Urban GIE.

The efficiency of urban green innovation is the result of multiple factors. This paper analyzed the influencing factors and spatial spillover effect of urban GIE from the aspects of environmental regulation (ER), foreign direct investment (FDI), manufacturing industry agglomeration (MIA), knowledge intensive service industry agglomeration (KISA), and financial development (FD). The variables were measured as follows.

Environmental regulation (ER): it is usually divided into the formal and informal environmental regulation. This paper mainly considered the impact of formal environment on the efficiency of green innovation. Previous studies of cites at the prefecture level used SO_2 removal rate as an

TABLE 1: Input-output indicator system of urban GIE.

Input- output structure	Variable layer	Index layer
Input variable	Capital input	Science and technology and education expenditure (input1)
	Labor input	Science and technology innovation personnel (input2)
	Innovation environment input	Public book collections per 100 people (input3)
		Number of internet users (input4)
Output variable	Technological output	Number of green patents granted (output1)
	Economic output	Per capita GDP (output2)
Undesirable output variable	Environmental pollution	Comprehensive environmental pollution index of industrial waste gas, industrial wastewater, and industrial fixed waste (bad-output)

indicator of environmental regulation at the city level. However, due to the change of the statistical caliber during the study period, we used the industrial smoke (dust) removal rate as an alternative indicator.

Foreign direct investment (FDI): to better smooth the volatility of the data, we used the city's FDI share of GDP for the year to represent it.

Manufacturing industry agglomeration (MIA): we used the manufacturing employment as the attribute value and measured the spatial Gini coefficient to express the manufacturing agglomeration. By calculating the location quotient of manufacturing industries in each city, we obtained the agglomeration level of the manufacturing industry.

Knowledge-intensive services industry agglomeration (KISA): according to the previous studies [51, 52], we selected the information, computer and software service, financial, leasing and business service, and education industries as the knowledge intensive industries. The agglomeration size is expressed by calculating the location quotient of the knowledge-intensive services in each city.

Financial Development (FD): It is expressed by the ratio of the sum of the loan balance and deposit balance of financial institutions in GDP at the end of the year.

3.3. Data Sources.
This paper selected 286 prefecture level cities in China from 2005 to 2017 as the research object. The adjustment of administrative regions in the study period is based on the initial year. The data of GDP per capita, personnel engaged in scientific and technological activities, expenditure on science and technology and education, number of books per 100 people, number of Internet users, industrial waste gas emissions, industrial waste water emissions, industrial fixed waste emissions, and other data in the research came from the *China Urban Statistical Yearbook* and the *China Regional Economic Statistical Yearbook*. Partial missing data are supplemented by interpolation. The patent data are from the China Patent Bulletin network of the State Intellectual Property Office (http://epub.sipo.gov.cn/). The identification of the green patent is to obtain the number of green patents authorized at the prefecture level by matching, extracting, and screening patents one by one based on the IPC Green Inventory provided by the World Property Organization (WIPO) (https://www.wipo.int/classifications/ipc/en/) and the international IPC code of green patents.

4. Results

4.1. Time Evolution Trend.
The feature of the efficiency structure of green innovation is: scale efficiency > pure technical efficiency > comprehensive technical efficiency. Factor input is the main source of efficiency, and technological progress is gradually becoming the driving force of efficiency improvement. Figure 1 illustrates the decomposition characteristics of GIE. From 2005 to 2017, the overall efficiency evolution was scale efficiency > pure technical efficiency > comprehensive technical efficiency. The value of scale efficiency was between 0.46 and 0.66, which was always the maximum and the main source of comprehensive technical efficiency, while the pure technical efficiency value was between 0.36 and 0.48, which was at a low level. This showed that the current development of green innovation in China was still dominated by the increase of innovation elements, while the role of organization operation and system management in the process of green innovation was ignored. However, in recent years, the evolution trend of pure technical efficiency and comprehensive technical efficiency shows the same upward trend, while the scale efficiency shows a slight downward trend. A possible explanation is that China has implemented a stronger innovation-driven development strategy in recent years and has made a series of reforms to its science and technology innovation system.

The overall efficiency is low, rising in a high-low crisscross and showing the trend of Eastern rising, central collapse, and northeast stagnation. From the national point of view, the average value of green innovation efficiency was 0.283 and the highest value was 0.32, indicating that the overall GIE of cities is still at a low level. In terms of the time evolution, it experienced a process of rising in a high-low crisscross. The rapid growth from 2013 to 2017 was more significant, which indicates that the green economic transformation and the construction of ecological civilization have achieved preliminary results in China. From the regional point of view, the overall efficiency value of the eastern region was higher than that of the central and western regions, showing zonal spatial differentiation. Among them, the value of the central and western regions was lower than the national average, and the central region was slightly lower than that of the western region. This shows that most of the central and western regions are still dominated by "high energy consumption, high pollution,
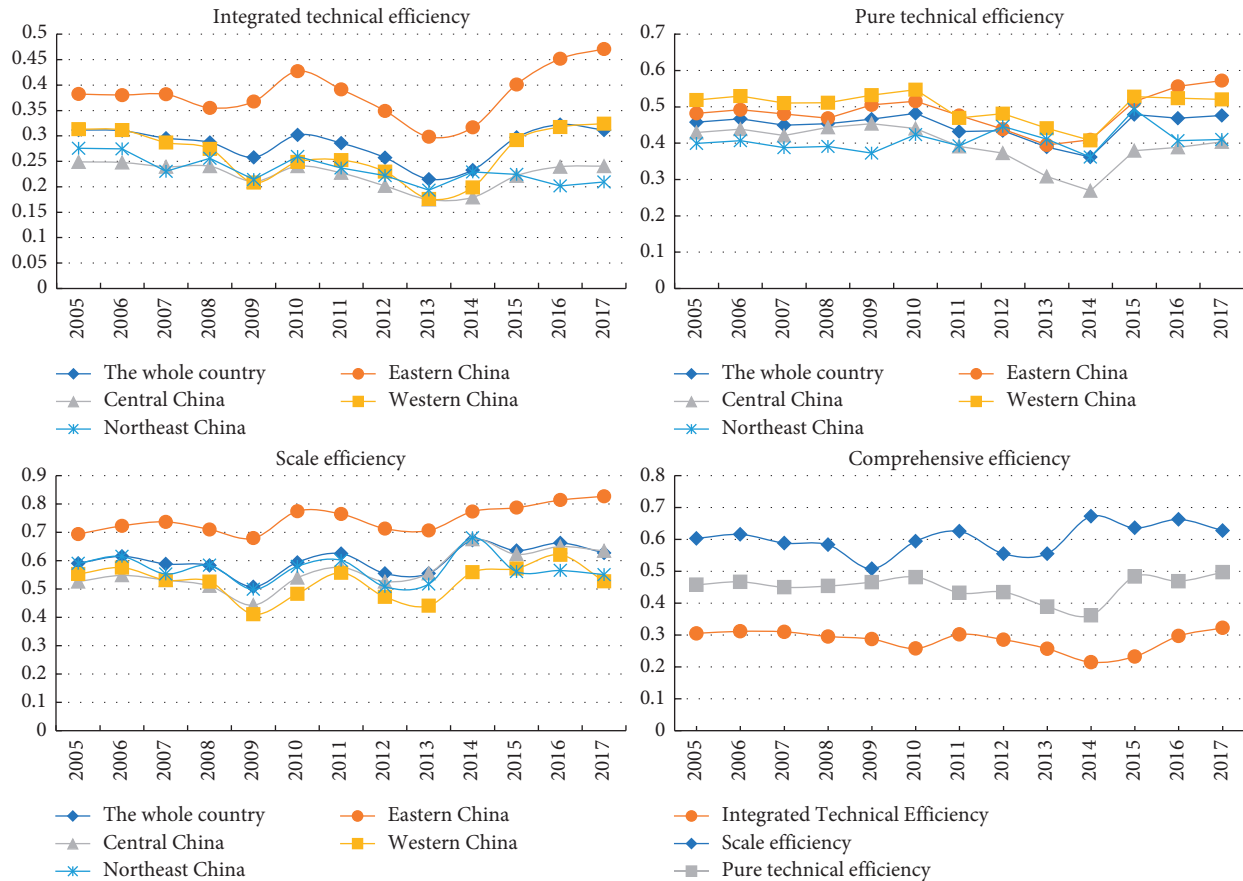
Figure 1: Urban green innovation efficiency temporal evolution.

and low efficiency" industries. Besides, the evolution trend of the eastern, central, and western regions was basically the same and tended to rise in a high-low crisscross, especially in the eastern and central regions. On the contrary, the efficiency value of Northeast China has declined in recent years, from 0.219 in 2014 to 0.209 in 2017, which also echoes the stagnation of the economic growth in Northeast China in recent years.

4.2. Spatial Heterogeneity and Spatial Relevance of Urban GIE. The spatial heterogeneity of urban GIE was significant, and it was roughly staggered in height along the Hu Huanyong line. Figure 2 shows the spatial distribution of green innovation efficiency in 2005 and 2017. On the whole, the spatial distribution of GIE was obviously uneven, with the Hu Huanyong line as the boundary, showing the characteristics of decreasing from southeast to northwest. The higher efficiency and relatively high efficiency mainly occurred in the eastern regions; the low efficiency and relatively low efficiency mainly occurred in cities in Guangxi, Yunnan, Guizhou, Gansu, Shaanxi, Jiangxi, Hunan, Hubei, and other provinces in the northwest China. The high-low unbalanced distribution pattern remained basically unchanged in two time periods, showing a strong local spatial dependence.

Urban GIE has significant spatial agglomeration and increasing innovation spillover effects. The Global Moran's I

index was significantly positive at 1% level for the period from 2005 to 2017, which indicates that there was a positive spatial autocorrelation in GIE of cities and cities with higher or lower efficiency spatially were neighboring clusters. Temporally, the values of the Global Moran's I index were small during the period from 2005 to 2010, which indicates a weak spatial agglomeration during this time period; the increase was larger between 2011 and 2017, from 0.099 in 2011 to 0.28 in 2017, which indicates an increase in the spatial agglomeration of GIE among cities (Table 2).

The hot spots were evolving in clusters, and the mosaic characteristics of innovation agglomeration were increasingly strengthened. Figure 3 shows the spatial distribution of hot and cold spots in 2005 and 2017. We can clearly find that the hot spots were distributed in Beijing, Tianjin, Hebei, Shandong, and areas in the Yangtze River Delta and Pearl River Delta. The central and western regions were generally cold spots, and there were no obvious high-value clusters. This was different from the spatial differentiation of green innovation efficiency, which shows that the spatial spillover effect of cities with high GIE in the central and western regions was limited. Furthermore, we find that the spatial dispersion of hot and cold spots did not vary much, which shows that the promotion of GIE was a relatively long-term process of technology accumulation. Besides, the regional innovation development and the industrial upgrading showed significant path dependence.
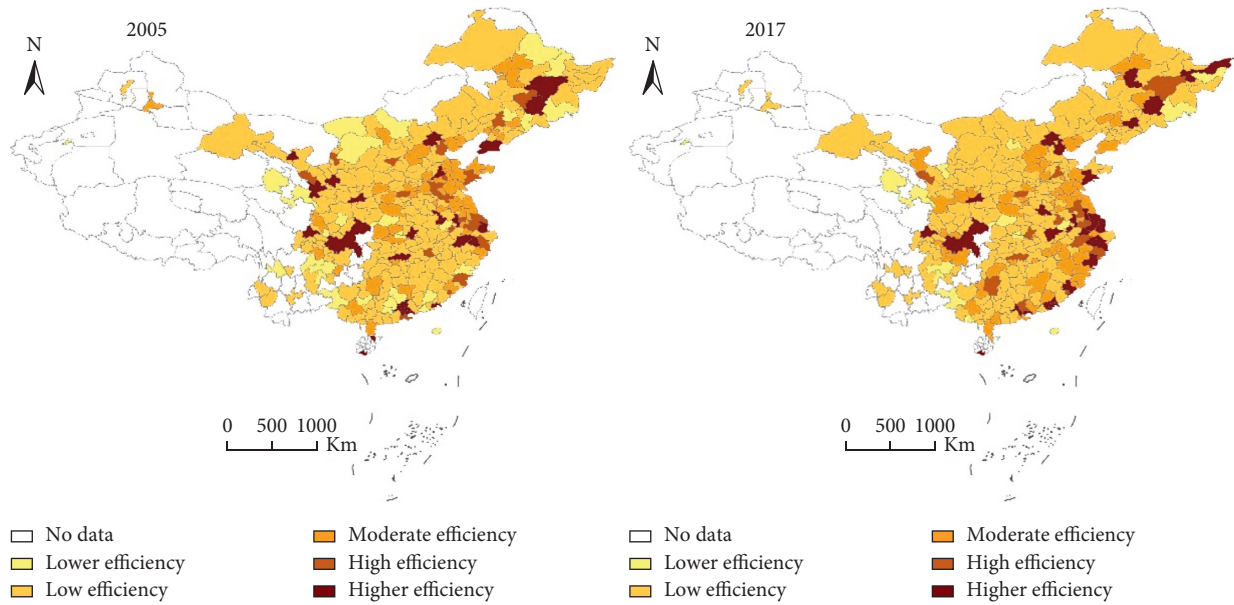
FIGURE 2: The spatial distribution evolution of urban GIE.

TABLE 2: Global Moran's I index from 2005 to 2017.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Global Moran's I	0.083	0.091	0.053	0.067	0.106	0.146	0.099	0.0854	0.116	0.147	0.206	0.211	0.28
Z	3.882	6.768	3.938	4.859	7.84	10.807	7.468	6.294	8.487	10.879	15.011	15.419	20.501
P	0	0	0	0	0	0	0	0	0	0	0	0	0
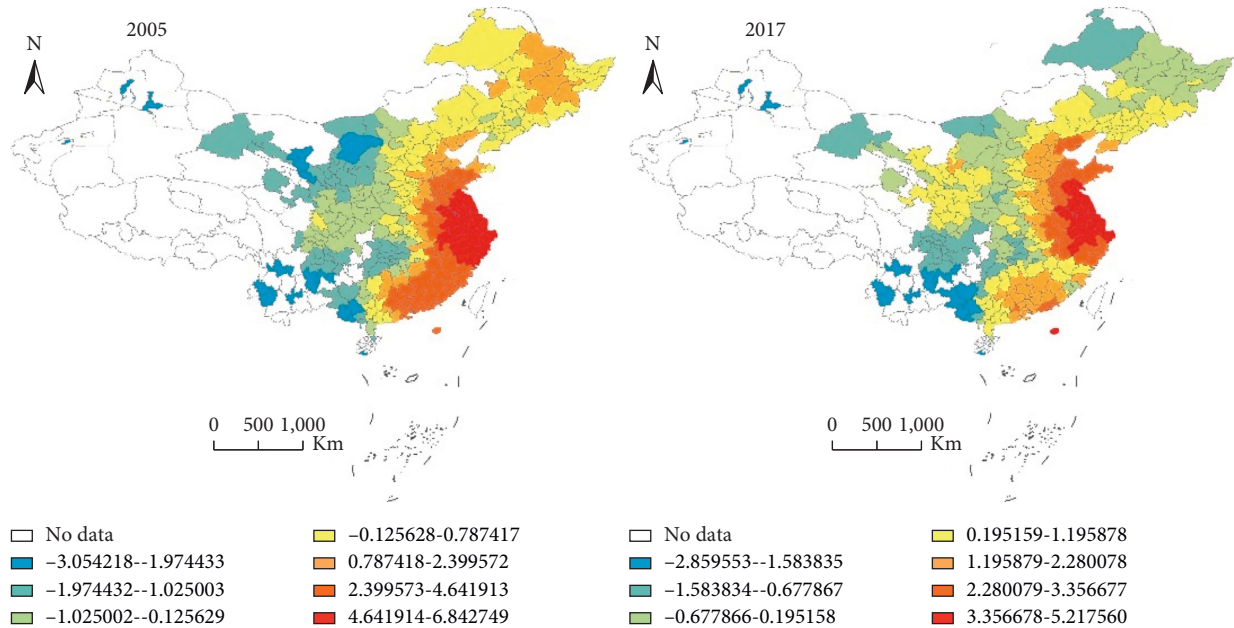
FIGURE 3: The evolution of hot spots and cold spots in urban GIE.

4.3. Decomposition of Urban GIE. In order to explore the sources of inefficiency in the internal input-output system, we decomposed the variables in the input-output system based on formula (3) and calculated the source and contribution rate of each variable's inefficiency decomposition with the help of Matlab2012a software platform (Table 3).

Input perspective: insufficient input in science and technology innovation personnel and public book collections per 100 people was the main source of inefficiency in most cities. From the decomposition of input inefficiency, the sources of inefficiency decomposition of cultural environment and innovation personnel were 0.423 and 0.435,

Table 3: The inefficient decomposition sources and its contribution rate.

	Region	Science and technology and education expenditure	Science and technology innovation personnel	Public book collections per 100 people	Number of Internet users	Number of green patents granted	Per capita GDP	Environmental pollution
Inefficient value	The whole country	0.356	0.423	0.374	0.435	0.413	0.026	0.493
	Eastern China	0.321	0.338	0.373	0.453	0.306	0.017	0.366
	Central China	0.409	0.440	0.344	0.454	0.421	0.033	0.606
	Western China	0.284	0.421	0.343	0.375	0.510	0.031	0.466
	Northeast China	0.409	0.493	0.438	0.460	0.414	0.024	0.533
Contribution ratio	The whole country	19.047%	22.648%	20.037%	23.310%	44.311%	2.793%	52.896%
	Eastern China	17.915%	18.824%	20.789%	25.265%	44.398%	2.434%	53.168%
	Central China	20.934%	22.550%	17.616%	23.264%	39.740%	3.115%	57.145%
	Western China	17.243%	25.561%	20.811%	22.750%	50.676%	3.032%	46.291%
	Northeast China	19.679%	23.733%	21.049%	22.109%	42.637%	2.448%	54.915%

respectively, and their contribution rates to the inefficiency were 22.65% and 23.31%, respectively, accounting for a high proportion in all input elements, which indicates that the innovation personnel and cultural environment were the main direction for improving the efficiency of the internal input-output system. From the perspective of vertical comparison, the contribution rate of science and technology innovation personnel inefficiency in the western and northeast regions was higher, which indicates that the urban green innovation development in these regions was facing a plight of insufficient innovative talents; however, the eastern regions had the largest contribution rate in the number of Internet users, which shows that compared with other regions, the eastern regions had an advantage in innovative talents but the innovation infrastructure still needs to be strengthened. The contribution rate of science and technology innovation personnel and number of Internet users in central China was more than 20%, which indicates that there was a large space for improvement in the investment of the innovative talents and innovation infrastructure in Central China.

Output perspective: excessive undesirable output and insufficient technological output were the main obstacles to improving the efficiency of urban green innovation. Among the sources of urban GIE inefficiency, the value of undesirable output reached 0.493 and the contribution rate in the whole output system reached 52.896%, followed by the inefficiency of technological outputs. The contribution rate of the undesirable output of the number of green patents granted at the national level was 44.311%. This shows that the current urban GIE is facing the dual constraints of excessive environmental pollution and weak technological progress. From a regional perspective, the environmental inefficiency of cities in the central and

northeast regions was particularly serious, with a contribution rate of 57.145% and 54.915%, respectively, which was in line with the actual situation of the serious environmental pollution in the central and northeast regions; while in the western cities, the inefficiency caused by environmental pollution was relatively weak, but the lack of technological output was the primary factor leading to the inefficiency and the ineffective contribution rate reached 50.676%.

4.4. Spatial Econometric Regression Results. In this paper, Matlab2012a is used to estimate the regression results of spatial econometrics. The code of model operation comes from the code of spatial econometric model developed by Elhorst [49]. The results of model estimation are shown in Tables 4 and 5. The selection of optimal interpretation model refers to the spatial panel econometric model test and selection framework proposed by Elhorst [49]. Firstly, the panel OLS regression without spatial effect is estimated, and the residual is tested. The results of LM Test has no spatial lag and robust LM Test also has no spatial lag test. For $P = 0$, indicating that SLM and SEM models are more optimized than OLS regression. Then, the Wald spatial lag and Wald spatial error tests and LR spatial lag and LR spatial error tests were used. The results showed that the p value passed the 1% significance level test, indicating that SDM was the best explanation model. Furthermore, $P = 0$ of Hausmann test significantly rejected the original hypothesis, indicating that fixed effects should be used. The results of LR-test spatial fixed effect and LR-test time-period fixed effect showed that the spatial and temporal double fixed effects should be used. Therefore, the final explanation of the model is the time and spatial double fixed effect of the spatial Durbin model.

TABLE 4: Nonspatial effects model regression results and related test results.

	OLS	Spatial fixed	Time fixed	Spatial and time fixed
FDI	0.071***	0.013	0.072***	0.015
	(9.994)	(1.383)	(10.391)	(1.61)
ER	−0.104***	−0.013	−0.092**	−0.014
	(−2.6)	(−0.403)	(−2.47)	(−0.441)
FD	0.619***	0.106*	0.637***	0.168*
	(18.292)	(1.669)	(19.189)	(2.372)
KISA	−0.008	−0.096***	−0.077**	0.032
	(−0.25)	(−3.233)	(−2.224)	(0.921)
MIA	0.178***	0.167***	0.085***	0.148***
	(8.018)	(3.919)	(3.606)	(3.509)
Intercept	−0.621***			
	(7.395)			
R2	0.206	0.010	0.235	0.006
sigma2	0.037	0.043	0.090	0.040
LM spatial lag test	369.587***	1375.605***	74.276***	61.860***
LM spatial error test	955.253***	1318.354***	110.418***	60.867***
Robust LM spatial lag test	67.156***	60.572***	2.491	1.444
Robust LM spatial error test	652.822***	3.321***	38.633***	0.452
Wald spatial lag test	20.009***			
Wald spatial error test	19.551***			
LR spatial lag test	24.004***			
LR spatial error test	23.692**			

Note: t statistics in parentheses. * $P < 0.05$, ** $P < 0.01$, and *** $P < 0.001$.

TABLE 5: Regression results of the spatial Durbin model.

Variable	Coefficient	t-stat	z-probability
FDI	0.0256**	2.5436	0.0110
ER	−0.0245	−0.7399	0.4594
FD	0.1526**	1.9676	0.0491
KISA	0.0349	0.9646	0.3347
MIA	0.1083**	2.3697	0.0178
W * FDI	−0.1011	−1.0990	0.2718
W * ER	0.9841**	2.0431	0.0410
W * FD	−0.1312	−0.4540	0.6499
W * KISA	−0.1089	−1.6126	0.1068
W * MIA	0.0776	0.3066	0.7591
W * dep.var	0.7910	19.8280	0.0000
R	0.6764		
sigma2	0.0423		

Note: * $P < 0.05$, ** $P < 0.01$, and *** $P < 0.001$.

The positive effect of FDI on the efficiency of urban GIE indicates that the sufficient capital, advanced technology, and management experience brought by FDI will have a certain demonstration effect on the local innovation subjects, so as to improve the efficiency of green innovation. The spatial lag coefficient was -0.1011, but it failed to pass the significance level test, which indicates that the spatial spillover effect of the foreign direct investment in local cities on proximity regions was negative, but not significant.

ER had no obvious effect on the efficiency of local green innovation, which shows that the policy tools and policy system of environmental regulation in China are not perfect and the backward effect on green innovation and the marginal effect of environmental improvement need to be improved. However, the spatial lag coefficient was 0.9841, reaching the significance level of 5%. This suggests that local

ER has a positive spillover effect on GIE in neighboring cities, which is consistent with the findings of Pan et al. [53].

The empirical results show that the FD has a positive effect on urban GIE. FD is conducive to reducing the financing cost of innovation subjects, solving the problem of information asymmetry, optimizing the allocation of innovation resources and industrial structure, and improving the efficiency of green innovation. The regression coefficient of spatial lag was −0.1312, which was not significant. This shows that the spatial spillover effect of local FD on proximity cities is not significant.

The regression results show that the effect of KISA on urban GIE in both local and neighboring cities is not significant. The regression coefficient of KIS was 0.0349, and the regression coefficient of spatial lag was −0.1089, all failing to pass the significance level test. The possible reason was that in most cities, the correlation between the development of knowledge-intensive services industry and the green innovation technology was not high.

MIA has a positive effect on the urban GIE, showing that manufacturing industrial agglomeration is convenient for the information dissemination, division of labor and cooperation, sharing infrastructure and labor market, and the resulting technology spillover and operating cost reduction are conducive to the improvement of technological innovation efficiency. The spatial lag regression coefficient was 0.0776, not reaching the significance level, which indicates that the spatial spillover effect of local MIA on adjacent cities is not significant.

5. Discussion and Conclusion

In this paper, the GIE of Chinese cities was comprehensively evaluated by using the Undesirable-SBM model to construct

the input-output index system of green innovation at the city level. The spatial-temporal evolution rules and influencing factors were revealed by using the exploratory spatial analysis and spatial econometric model. To sum up, the following main findings can be drawn:

(1) Generally speaking, the GIE in Chinese cities is low and there is a large space for improvement. The feature of the decomposition of efficiency is scale efficiency > pure technical efficiency > comprehensive technical efficiency. The allocation of input-output of green innovation elements has not reached the optimal stage. However, from the perspective of evolution, the urban GIE in Northeast China is declining.

(2) From the perspective of spatial evolution, the spatial differentiation of urban GIE evolves from polarization to equilibrium, with prominent Matthew effect. Cities with high or low efficiency are scattered on both sides of the Hu Huanyong line, and the changes of the urban quantity structure and spatial transition are small. In terms of spatial agglomeration, the Global Moran's I index fluctuates and the GIE tends to strengthen the agglomeration; however, the local hot and cold spots do not change much and the clustering of hot and cold spots shows the characteristics of spatial locking.

(3) In terms of the structure of input-output system, the lack of investment in science and technology innovation personnel and innovation environment in the input system is the main source of inefficient investment in most cities. In the output system, the high output of environmental pollution and the lack of technological output are the main factors that restrict the promotion of urban GIE, especially in Central and Northeast China.

(4) In terms of driving factors, the foreign direct investment, financial development, and manufacturing industry agglomeration have positive effects on the efficiency of urban GIE. However, the environmental regulation and the knowledge-intensive service industry agglomeration cannot promote the efficiency of GIE in most cities.

In the face of the serious ecological pollution, the Chinese government has made a huge commitment to promote green development. However, the results of this paper show that the level of green innovation efficiency in Chinese cities is still at a low level. Clearly, the findings of this paper have implications for policy formulation.

(1) Considering the current situation that the overall GIE in Chinese cities is low, the proportion of pure technical efficiency is not high and the structure of green innovation input and output is still unreasonable, the Chinese government should adhere to the national strategy of the innovation-driven development and ecological civilization construction. In addition to the traditional innovation investment, the Chinese government should pay more attention to the reform of green innovation system. On the one hand, it is to complete the service system of green innovation and create an open, inclusive, collaborative, and efficient innovation environment. On the other hand, it is to cultivate more outstanding talents and improve the training mode and the evaluation and incentive mechanism for innovative talents.

(2) The Chinese government should implement spatially differentiated environmental regulation policies and industrial policies, given that the current urban green innovation development patterns are inconsistent across different regions of China and that different socioeconomic factors operate differently on urban GIE. The current priority is to address the environmental pollution in Central and Northeast China and to increase the R&D investment and financial support to these cities, while the governments in the eastern and western regions should adopt stricter environmental regulation policies and improve the innovation infrastructure. At the same time, none of the governments should adopt a "one-size-fits-all" approach and a "herd effect" mode of following in the industrial upgrading and transformation; they should all focus on the development of industries that are compatible with the local innovation environment and the innovation capability of the cities. Only in this way can we achieve the coordinated and sustainable development of urban economy and environment.

(3) Urban GIE has the characteristics of spatial agglomeration, but it also has obvious problems of the uneven regional development and the "Matthew effect." This warns the Chinese government to pay attention to the uneven regional development of urban GIE. The government should strengthen its intervention in the technology trading market to avoid excessive concentration of innovation resources in a few cities; based on such an idea, the government should promote interregional innovation cooperation among innovation agents such as universities, research institutions, and enterprises and establish cross-regional platforms for innovation resource sharing and technology transfer; in addition to this, it should establish a counterpart innovation assistance system between regions, to promote the superior innovative cities to fund the less developed ones and encourage the docking cooperation between the eastern and the central-western and northeastern regions.

Although this paper provides new ideas for the study of urban GIE and explored its driving factors, there are still some limitations. On the one hand, for the measurement of urban pollutant emissions, we selected only the industrial pollution emissions. On the other hand, we captured only a portion of the urban GIE influencing factors. However, the measurement of green innovation efficiency is not only a question of whether the index selection is scientific and comprehensive but also about whether the evaluation

method is accurate and reasonable. Therefore, further research is required to build a more comprehensive evaluation framework of green innovation efficiency, to explore the impact of more factors on green innovation efficiency and explain the spatial mechanism of the effect of these factors on green innovation efficiency in local and adjacent areas.

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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Hindawi

Retraction

Retracted: Rural Workplace Sustainable Development of Smart Rural Governance Workplace Platform for Efficient Enterprise Performances

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] Y. Wu and W. Ma, "Rural Workplace Sustainable Development of Smart Rural Governance Workplace Platform for Efficient Enterprise Performances," *Journal of Environmental and Public Health*, vol. 2022, Article ID 1588638, 11 pages, 2022.

Research Article

Rural Workplace Sustainable Development of Smart Rural Governance Workplace Platform for Efficient Enterprise Performances

Yingli Wu[1] and Wanying Ma [2]

[1]*Agricultural and Rural Development Institute, Heilongjiang Provincial Academy of Social Sciences, Harbin, China*
[2]*Changchun Guanghua University, College of Business, Jilin, Changchun 130033, China*

Correspondence should be addressed to Wanying Ma; 18409208@masu.edu.cn

In the long developmental process, China's agriculture has transformed from organic agriculture to inorganic agriculture. New technologies have made the modernization of agriculture possible. However, most older people who are engaged in agriculture may not completely understand the modernization of agriculture. Based on the limitations of traditional image target detection methods, a deep learning-based pest target detection and recognition method is proposed from a blockchain perspective, to analyze and research agricultural data supervision and governance and explore the effectiveness of deep learning methods in crop pest detection and recognition. The comparative analysis demonstrates that the average precision (AP) of GA-CPN-LAR (global activation-characteristic pyramid network-local activation region) increases by 4.2% compared with other methods. Whether under the Inception or ResNet-50 backbone networks, the AP of GA-CPN-LAR is significantly better than other methods. Compared with the ResNet-50 backbone network, GA-CPN-LAR has higher accuracy and recall rates under Inception. Precision-recall curve measurement shows that the proposed method can significantly reduce the false detection rate and missed detection rate. The GA-CPN-LAR model proposed here has a higher AP value on the MPD dataset than the other target detection methods, which can be increased by 4.2%. Besides, the accuracy and recall of the GA-CPN-LAR method corresponding to two representative pests under the initial feature extractor are higher than the MPD dataset baseline. In addition, the research results of the MPD dataset and AgriPest dataset also show that the pest target detection method based on convolutional neural networks (CNNs) has a good presentation effect and can significantly reduce false detection and missed detection. Moreover, the pest regulation based on blockchain and deep learning comprehensively considers global and local feature extraction and pattern recognition, which positively impacts the conscientization of agricultural data processing and promotes the sustainable development of rural areas.

1. Introduction

In the long-term development process, Chinese agriculture has transformed from organic agriculture to inorganic agriculture. New technologies make it possible to modernize agriculture. However, most older adults working in agriculture may not fully understand the modernization of agriculture. Currently, there are fewer Internet services for agricultural technology and agricultural knowledge. The breadth of geography makes it difficult to achieve the target technology. Therefore, it is very urgent to analyze and study agricultural modernization from the perspective of information technology. Agriculture should develop in the direction of science and intelligence, which is also crucial for the development of smart agriculture [1, 2]. In addition, in recent years, blockchain technology has developed rapidly, which is one of the ten typical technology applications of the Internet. The blockchain is a digital record updated and distributed in chronological order with encryption protection. Compared with a linear blockchain, the blockchain stores information in each block, connects them to each other, and shares the entire network among all participants.

It has the characteristics of openness and autonomy, which are extensively applied in increasing fields and industries. This technology is also a means and tool to serve economic activities to facilitate the development of related transactions [3–5]. The depth of deep learning is compared to shallow machine learning methods, which is the current research hotspot in the field of machine learning. It is a general term for learning methods based on deep learning networks originating from artificial neural networks. The deep learning network started in the 1940s and mainly solved various machine problems by trying to simulate the cognitive mechanism of the human brain.

Agriculture is China's primary industry, and its integration with blockchain started late in China. There is no doubt that the integration of blockchain and agriculture is very necessary with the rapid development of big data technology and modern technology. Lin et al. analyzed the role of blockchain technology in improving the efficiency of sustainable agricultural development. They proposed an e-agriculture model system with blockchain infrastructure [6]. Au emphasized the application value of blockchain technology in agriculture, IoT, energy, and finance [7]. Khan et al. took secure IoT blockchain data as the research object and proposed a hybrid model based on recurrent neural networks by using deep learning algorithms to analyze the agriculture and food industries. They evaluated the performance under different numbers of households, providing a reference for supply chain practitioners to develop advanced deep learning forecasting policies using the latest technology [8]. To sum up, some research results have been achieved in the application of blockchain technology in the agricultural field. However, there are still few studies exploring the combination of blockchain and deep learning methods in the agricultural field.

In this context, this work proposes an image target detection method that combines global and local features to find a detection method suitable for pest identification and build an intelligent agricultural data supervision platform. Besides, this scheme's feasibility in agricultural data supervision is analyzed to provide a reference for sustainable agricultural development. Figure 1 displays the organizational structure of this article.

2. Methods

2.1. The Blockchain Technology. It is an intelligent peer-to-peer network. Blockchain can identify and disseminate information through distributed databases [9, 10]. The blockchain ecosystem is developed based on Bitcoin. With the continuous improvement and optimization of algorithms, blockchain has been gradually integrated with different industries. The formation of scalable smart contracts in this process makes the integration of the sharing economy possible, and industrialization can be accomplished. Smart contracts are one of the key elements for mainstream blockchain platforms. This is actually a computer program based on which information can be processed and stored. According to its definition, the blockchain consists of data blocks, and different data blocks correspond to different

network transaction information. These blocks can verify the validity of the data information, from which the next block is generated [11]. In general, blockchain is a distributed accounting method under decentralization. Its principal function is to enable different objects participating in it to establish technical trust. The development and maturity of this technology have attracted many parties. The application of this technology in the agricultural field is also very concerned [12]. In essence, blockchain is a value transfer trust protocol and a database under decentralization. This feature of decentralization also makes the technology very secure. Based on the background of agricultural modernization, blockchain is introduced to construct the rural intelligent data supervision and government platform considering that data supervision is important for the intellectual development of agriculture.

In addition, the application of blockchain technology to the sustainable development of rural areas has many advantages, as shown in Figure 2.

It can be found from Figure 2 that the advantages of blockchain technology in the sustainable development of rural areas are mainly reflected in four aspects: decentralization, openness, independence, and security. Decentralization means that blockchain technology does not rely on additional third-party rural management agencies or hardware facilities, and there is no central control. Except for the self-contained blockchain itself, each node realizes information self-verification, delivery, and management through distributed accounting and storage. In addition to the encrypted private information of transaction parties, the blockchain's data are open to all local people in rural areas. Anyone can query the blockchain data and develop related applications through the open interface, so the information of the entire rural system is highly transparent. Independence means that the entire blockchain system does not rely on other third parties, and all nodes can automatically and securely verify and exchange data within the system without any human intervention. Security indicates that attackers cannot arbitrarily manipulate and modify the network data as long as they cannot control 51% of all data nodes, which makes the blockchain safe and avoids artificial data changes in rural areas.

Figure 3 reveals the operating principle of blockchain technology.

2.2. Deep Learning and Convolutional Neural Network. Deep learning promotes the development of artificial intelligence technology. Under deep learning, the system can learn relevant features actively. The elementary idea of deep learning is to express the input information hierarchically by learning large quantities of samples and stacking feature hierarchies [13, 14]. This method imitates the cognition and behaviors of human brains. The deep learning-based neural networks can understand data information of images and texts from shallow to deep, from simple to complex, and from concrete to abstract. The entire construction of attributes and characteristics is also a process of seeking the law of data development. The theoretical model of deep learning is presented in Figure 4.

Chapter I Introduction	This paper introduces the research background, relevant literature review and the organizational structure of this paper
Chapter II Method	The effectiveness of deep learning method in crop pest detection and identification is discussed. Blockchain technology, deep learning, the design and establishment of ga-cpn and lar models are introduced
Chapter III Results and Discussion	The proposed ga-cpn-lar model is compared with other algorithms in MPD dataset and agripest dataset
Chapter IV Conclusion	This paper summarizes the full text and puts forward the future research direction

FIGURE 1: Text organization.

Among the components of the deep learning method, convolutional neural network (CNN) is a type of feedforward neural network. It applies to the processing of data formed by a grid structure [15, 16]. In image processing, CNN can extract and process data features. The core structure of CNN includes the convolutional layer, the pooling layer, the normalization layer, and the fully connected layer. Among them, the convolutional layer is a unique component of CNN [17], and its operational implementation can be expressed as follows:

$$y(t) = \int x(a)k(t-a)\mathrm{d}a, \tag{1}$$

where x represents the input vector, k represents the convolution kernel, and t represents different moments of the corresponding convolution operation. Among the convolutional layers, the convolution kernel is the most critical component, and the output corresponding to the convolution can be obtained by the convolution kernel through uniform sliding at the moment of dimension. Convolution operations involving multiple dimensions can be expressed as`:

$$Y(i, j) = \sum_m \sum_n X(m, n)K(i-m, j-n), \tag{2}$$

where X represents the two-dimensional input matrix, and K represents the two-dimensional convolution kernel. The convolutional layer in CNN can reduce the calculation parameters and the amount of calculation significantly.

The major function of the pooling layer is to reduce the dimensionality of the feature map, which can reduce the number of parameters and retain the initial feature information of the image to the greatest extent as well [18]. The convolution operation is a linear operation method with limitations in processing and expressing nonlinear data. Hence, a nonlinear activation function is introduced into the CNN structure to achieve the nonlinear modeling of neural networks [19]. In addition, this activation function can also filter redundant information so that the data features can be retained. The essence of the normalization layer in CNN is the zero-average processing for the convolutional layer structure in the neural network. For images, it is the normalization processing operation for each channel. The nonlinearity of the corresponding data can be reduced
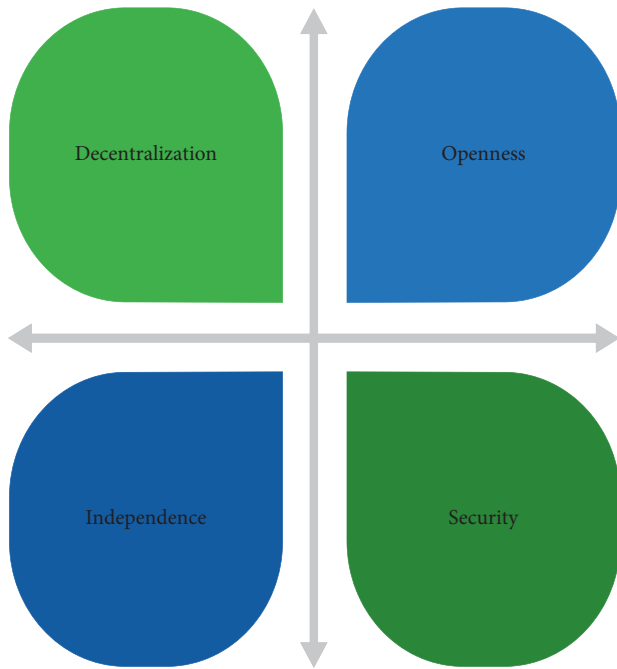
FIGURE 2: Advantages of blockchain technology in rural sustainable development.
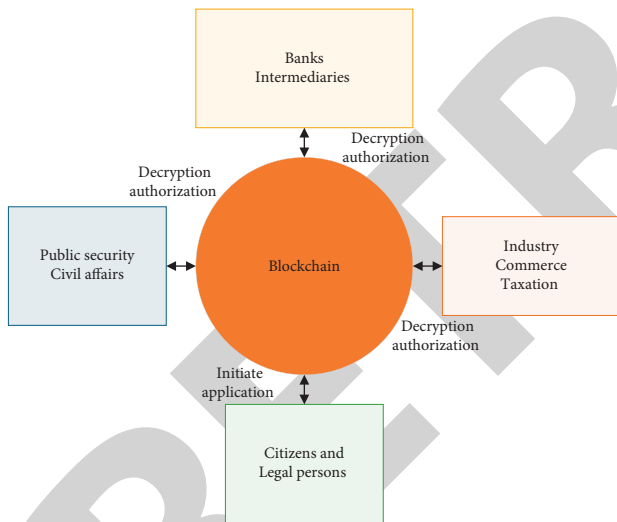

FIGURE 3: How blockchain technology works.

through normalization. During network training, the overall direction of network learning is determined by the loss function, and the correctness of the training process is also inseparable from the loss function. The excellent performance of CNN in many fields is due to these special network composition structures.

CNN has an excellent performance in feature extraction. In the deep learning field, there have been many CNN-based target detection algorithms. In recent years, target detection technology has developed rapidly. However, in the agricultural field, the recognition and detection of crop pests have not yet achieved practical deep learning applications. Traditional pest recognition methods mainly depend on the
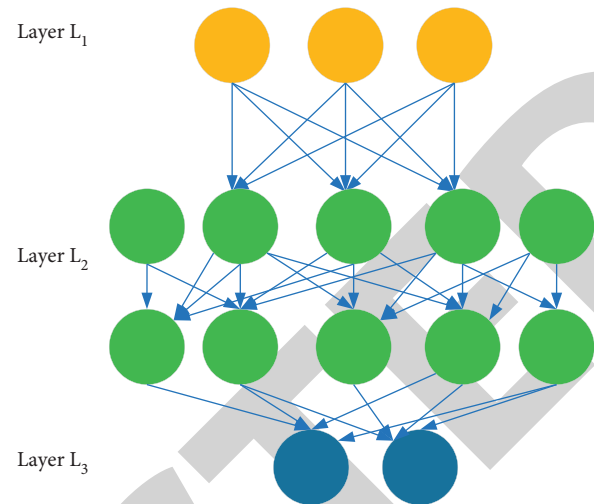
FIGURE 4: Deep learning model.

manual design of features. The feature descriptors involved are color, shape, and texture. Although this method can identify pests, the basis of manual design is not universal. The design of feature descriptors needs to be based on different types of pests and their specific images. The breakthrough of deep learning in image recognition and detection provides possibilities for image target detection. The primary process of pest recognition in the agricultural field includes feature extraction and pattern recognition. Unlike traditional methods, the deep learning method uses CNN for feature extraction. The image target detection based on the deep learning method also shows good performance in pattern recognition. The excellent characteristics of this method in image target detection are also applicable in crop pest recognition and detection. The deep learning method provides a new direction for the detection and recognition of pests. However, there are still some problems in practical applications. In most cases, the feature extractor chooses the backbone network. Nevertheless, due to the serious problem of target occlusion in the virtual image environment, the adaptability of the network for feature extraction is poor. In addition, due to the small size of pests themselves, neural network algorithms, such as Faster Region-CNN (R-CNN), are not effective in detecting small targets. Regardless of this problem, a pest recognition and detection method that integrates global and local features is proposed based on CNN. Given the small-sized detection target, a top-down feature transfer structure is introduced to improve the effective detection of small targets. A global activation-characteristic pyramid network (GA-CPN) is introduced to solve the problem of severe occlusion in pest target detection, achieving the high-quality detection and recognition of pests.

2.3. Design and Establishment of GA-CPN and LAR Models

2.3.1. Design of GA-CPN. LAR includes the channel attention and spatial attention modules. When designing this module, a global pooling operation F_{gp} is introduced in the CNN model, which is specifically expressed as:

$$z_p = F_{gp}(x_c) = \frac{1}{H_g \times W_g} \sum_{i=1}^{H_g} \sum_{j=1}^{W_g} x_c(i, j), \tag{3}$$

where x_c represents the branch tensor of the module, $H_g \times W_g$ represents the channel size of the feature map, and z_p represents the pooling output of the corresponding feature map. Introducing F_{gp} aims to remove the function of the feature map on the feature weights H_g and W_g. This operation can remove the effect brought by the spatial information by placing the three-dimensional feature map on a one-dimensional vector. In the meantime, z_p corresponding to each channel can describe the corresponding feature map composition information. On this basis, a two-layer fully connected CNN is introduced to implement feature extraction U_c of z_p, which is specifically expressed as:

$$U_c = \sigma_2\left(P_2^T \sigma_1\left(P_1^T Z_p + b_1\right) + b_2\right), \tag{4}$$

where P_1 represents the learning parameter of the first fully connected layer, P_2 is the learning parameter of the second fully connected layer, and b_1 and b_2 correspond to the bias.

The rectified linear unit (ReLU) is taken as the activation function of the first layer and sigmoid as the activation function of the second layer. The input global feature map corresponding to X_g and the output activation vector corresponding to U_c are subjected to weighted average processing, which is specifically expressed as follows:

$$\widetilde{x}_c = x_c \cdot u_c, \tag{5}$$

where x_c represents the characteristic activation maps corresponding to different channels.

The main purpose of designing the spatial attention module is to note the small size detection target position and remove some influences brought by the channel information as well. This module is trained based on supervised learning. First, for the removal of each channel information, a global convolution operation F_{gc} is introduced in this module design, which is expressed as follows:

$$z_s(i, j) = F_{gc}(X_g) = \sum_{c=1}^{C_g} \sum_m \sum_n X_g(i+m, j+n, c) K(m, n, c) + b, \tag{6}$$

where K represents the convolution kernel corresponding to the operation, its size is $m \times n \times C_g$, and b represents the bias. In the global convolution process, the number corresponding to K is 1, the size of the corresponding output feature map is $H_g \times W_g \times 1$, and the number of corresponding channels is 1. At this time, the features at different positions correspond to the spatial features of the image. On this basis, two sets of dilated convolutions with different convolution kernel sizes are used for learning and activating the matrix so that the spatial receptive field can be expanded, which is specifically expressed as follows:

$$U_s = \sigma_2\left(K_2 * \sigma_1\left(K_1 * Z_S + b_1\right) + b_2\right), \tag{7}$$

where K_1 and K_2 represent the convolution kernel, and b_1 and b_2 represent the bias. In this module, ReLU and sigmoid

are also selected as activation functions. In the network training, the pixel set-based cross-entropy loss PCE is introduced as the loss function, which is specifically expressed as follows:

$$PCE(U_S, U_{gt}) = \frac{1}{H_g \times W_g} \sum_{i=1}^{H_g} \sum_{j=1}^{W_g} -U_{gt}(i, j) \log U_s(i, j), \tag{8}$$

where U_{gt} represents the activation map formed at the labeled bounding box, and U_S represents the spatial feature activation matrix. The relevant target information is preserved in the form of exponential operation at each channel to preserve the global information of the feature map. A spatial activation global feature map X_g based on the spatial dimension is finally obtained by stacking the activation feature maps on each channel.

2.3.2. Local Activation Region (LAR) module. In the deep learning field, R-CNN has good performance in extracting and expressing local image features, which can classify and detect various images [20, 21]. The network is generated based on the LAR to optimize the performance of R-CNN in image processing. LAR mainly includes two modules: contextual feature enhancement and self-attention activation [22, 23]. The former aims to solve the problem of insufficient target information of small size [24, 25]. For the candidate frames in the standard region generative network, based on RoI pooling, local feature X_l can be extracted from all the candidate frames obtained by training from the global activation feature map X_g. The specific expression is as follows:

$$X_l(i, j, c) = \frac{k^2}{wh} \sum_{m=x_1}^{wkli} \sum_{n=y_1}^{hkli} \widetilde{X_g}(m, n, c), \tag{9}$$

where k represents the size of the output feature map, which takes seven under normal circumstances. The average pooling operation is performed on the cropped subregions obtained by RoI pooling, and finally, the local feature map corresponding to the candidate frame can be output [26, 27]. In this module, the candidate frames in different directions are expanded to contain more contextual information. The quality of the pest information contained in the final local feature map is higher based on this module [28, 29].

The self-attention activation module aims to buffer the insensitivity of the fully connected neural network in the spatial information [30, 31]. The module includes three parallel convolution operations. The local feature maps' output by the three branches can be expressed as follows:

$$\begin{aligned} f(X_l') &= K_f * X_l', \\ g(X_l') &= K_g * X_l', \\ h(X_l') &= K_h * X_l', \end{aligned} \tag{10}$$

where K_f, K_g, and K_h represent the convolution kernels, and the corresponding size is $1 \times 1 \times C_l$. Based on these three branches, the corresponding feature map can contain the

feature information of each position, thereby completing the interactive processing of the information. The corresponding output s can be expressed as:

$$s = f\left(X'_l\right)^T g\left(X'_l\right). \tag{11}$$

Furthermore, the dimensionality is reduced through convolution operation, and the softmax activation function is used to learn the weight value at each position. Specifically, the activation matrix is expressed as:

$$U_a(i,j) = \frac{\exp(s(i,j))}{\sum_{m=1}^{k}\sum_{n=1}^{k}\exp(s(m,n))}. \tag{12}$$

Under such a training method, the self-attention activation matrix obtained above is merged with the third network branch structure so that the local position information can be noted.

The image target detection method based on the two modules of GA-CPN and LAR is introduced to design and construct the agricultural data supervision and governance model, in an effort to provide a direction for sustainable development in rural areas [32]. The image target detection method that combines the two modules of GA-CPN and LAR is denoted as GA-CPN-LAR.

2.4. Construction of the Agricultural Data Supervision Model. With the continuous development and advancement of agricultural science and technology, the number of data resources has also increased rapidly. However, due to the influence of hierarchical and decentralized factors, fragmented data make the accurate acquisition of data difficult, which has affected the development of agriculture towards science and intelligence [33]. Hence, it is very necessary to find a method suitable for integrating and processing complex agricultural data. A scientific system for agricultural data supervision and governance should follow the principles of truth-seeking, systematicity, timeliness, accuracy, and predictability. From the demand perspective, the scientific supervision of agricultural data and the establishment of the government platform should comprehensively consider factors such as data collection, data organization, data storage, and data sharing [34]. The implementation or smooth progress of this process requires the blessing of data fusion or algorithms. Data workers serving the platform should try their best to participate in the various processes of data processing. Yan et al. [35] quoted blockchain technology and deep learning technology into the dataset and classified it after integrating a large amount of complex data. They found that combining these two technologies has broad applicability, and the data classification processing accuracy is high [35]. The agricultural data supervision and governance model constructed from a blockchain perspective is shown in Figure 5. Among them, the analytical focus is pest detection and recognition, which is implemented through deep learning methods [36–39].

As can be seen from Figure 5, the implementation of agricultural data supervision requires blockchain technology. First, a detailed design of the agricultural supervision

and governance plan is carried out. Then, data development, data collection, and data analysis are performed on the set platform. Finally, the effective data are stored in the cloud network disk to use and disseminate the data at any time and integrate new experimental data [40]. For the GA-CPN-LAR target detection method, armyworm (A), corn borer (CB), plant louse (PL), wheat spiders (WS), bollworm (B), and *Mamestra brassicae* Linnaeus (MB) are selected as the research objects [41, 42]. Under the MPD and AgriPest datasets, several target detection methods, namely single-shot multi-box detector (SSD), are used. A single-shot multi-box detector is an object detection algorithm to produce a fixed-size set of bounding boxes and scores of object class instances present in these bounding boxes, followed by a non-maximum suppression step to produce the final detection. SSD consists of two parts: the backbone and the head. The backbone model is usually a pretrained image classification network. The SSD head is one or more convolutional layers added to the backbone. The output is interpreted as the bounding box and category of objects in the spatial location of the last layer of activation. The feature pyramid network (FPN) is a feature extractor designed to improve accuracy and speed. It replaces the feature extractor in detectors such as Faster R-CNN and generates a higher quality feature map pyramid. An FPN consists of bottom-up and top-down paths. The bottom-up path is a commonly used convolutional network for feature extraction. Spatial resolution decreases from bottom to top. The semantic value of each layer increases as higher-level structures are detected. The Faster R-CNN can be simply regarded as an upgraded version of R-CNN and Fast R-CNN or a system of "Regional Generation Network + Fast R-CNN," which replaces the selective search method in Fast R-CNN with the regional generation network. The AP (average precision) value and precision-recall curve are used as evaluation indicators for the comparison between the above methods and the proposed GA-CPN-LAR.

3. Results and Discussion

3.1. Image Target Detection Based on MPD Dataset. Figure 6 compares SSD, FPN, and Faster R-CNN target detection methods with the GA-CPN-LAR model proposed here on the MPD dataset.

The distribution and change of AP value in Figure 6 suggest that the GA-CPN-LAR model has a higher AP value than the other target detection methods, which is increased by 4.2%. The AP value of each detection method under different CNN backbone networks shows a similar trend. Specifically, the AP value of the SSD method is 51.35. Under the initial backbone network, the AP value of Faster R-CNN is 66.73, and that of FPN is 70.03. In contrast, the AP value of the GA-CPN-LAR model is 71.97. Under the ResNet-50 backbone network, the AP value of the Faster R-CNN, FPN, and GA-CPN-LAR is 70.97, 78.14, and 80.75, respectively. Therefore, the AP value of several target detection methods in the initial state can be increased by 2.1% compared with ResNet-50.

Two crop pests, corn borer and bollworm, are taken as examples. Under the Inception backbone network, the
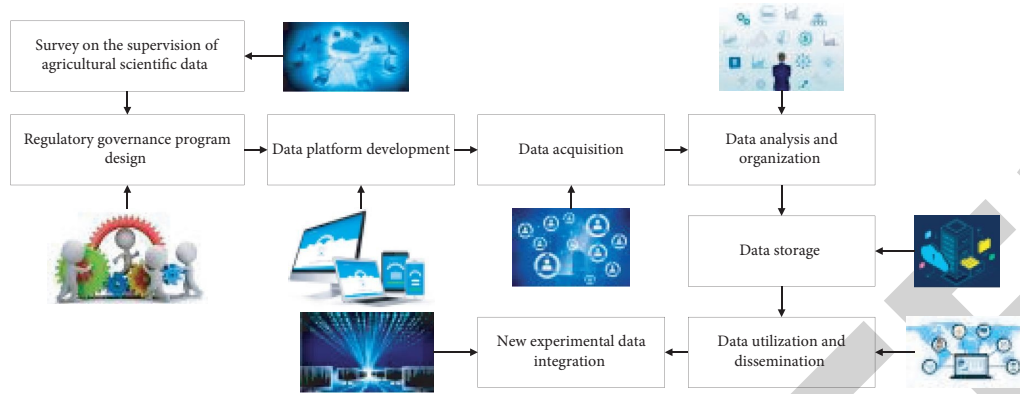
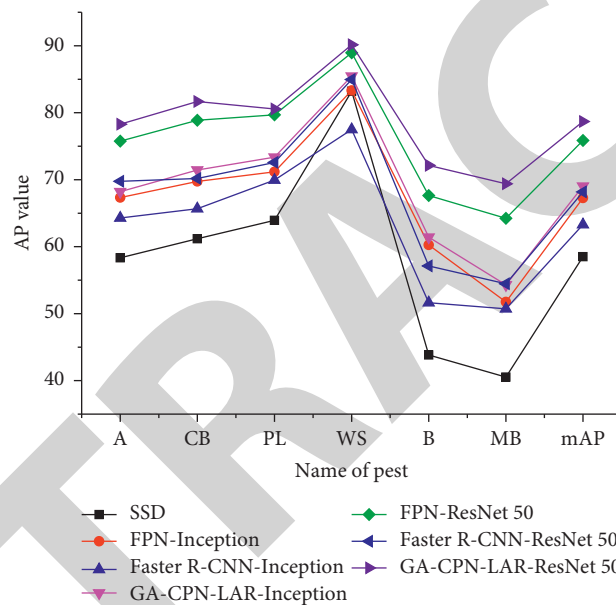FIGURE 5: The agricultural data supervision and governance model.

FIGURE 6: Comparison of several target detection methods' AP values under MPD dataset.

precision-recall curves of several target detection methods under the MPD dataset are shown in Figures 7(a) and 7(b).

Data changes in Figure 7 suggest that compared with the baseline of the MPD dataset, the accuracy and recall rate of the GA-CPN-LAR method corresponding to the two representative pests under the Inception feature extractor are higher.

The reason is that the proposed target detection method introduces the unique structure of the characteristic pyramid. The proposed GA-CPN-LAR can locate the crop pest target for each multilevel feature map so that the pests can be located more accurately. Introducing global activation features can improve the extraction quality of image features effectively. Introducing a contextual attention mechanism can learn local activation matrices, making the neural network more sensitive to the exact positions of the pests in different regions. This is also the reason for the improvement in the overall detection performance of GA-CPN-LAR proposed in the case of local features. The precision-recall curves show that the GA-CPN-LAR method can reduce the

probability of false detection and missed detection for pest detection effectively.

3.2. Image Target Detection Based on AgriPest Dataset. Under the AgriPest dataset, the target detection methods of SSD, FPN, and Faster R-CNN are compared with the proposed GA-CPN-LAR. The results are shown in Figure 8.

Under the AgriPest dataset, the Faster R-CNN target detection method performs unsatisfactorily in detecting pests. In contrast, the proposed GA-CPN-LAR deep target detection method has a better AP value than other target detection methods, which can be increased by 3.2–9.8%.

In addition, two crop pests, corn borer and bollworm, are taken as examples. Under the Inception backbone network, the precision-recall curves of several target detection methods under the AgriPest dataset are shown in Figures 9(a) and 9(b).

Compared with other target detection methods, the proposed GA-CPN-LAR method has higher accuracy and

(a)

(b)
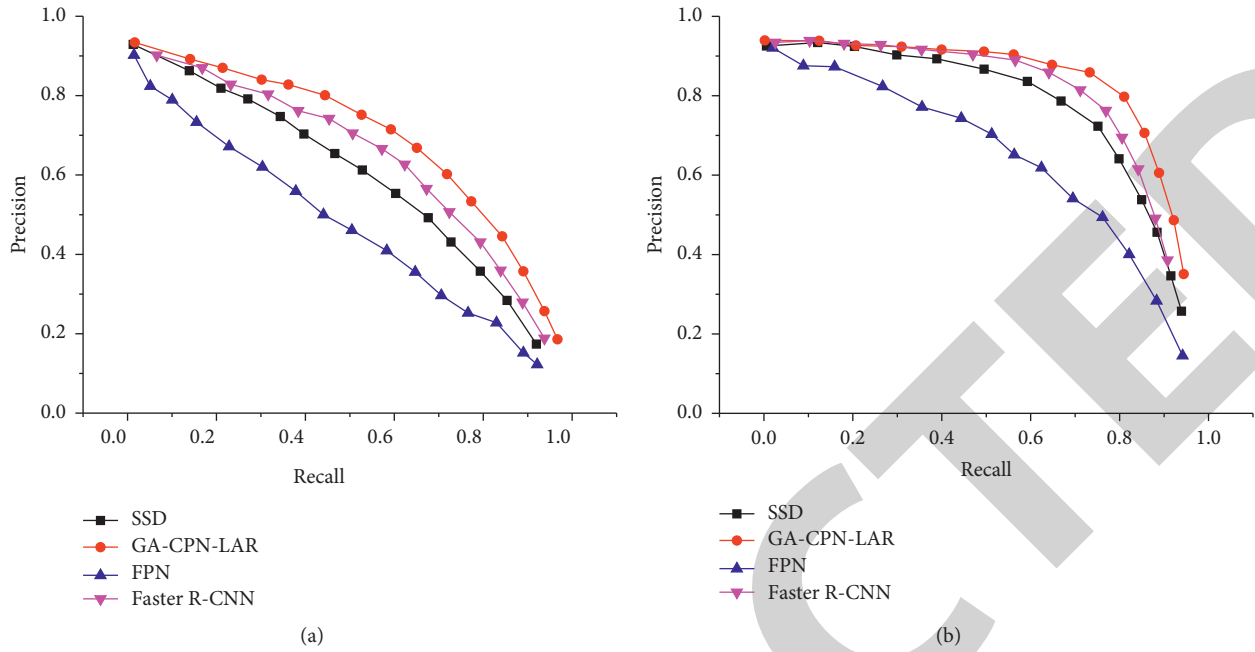
Figure 7: Precision-recall curves based on Inception under MPD dataset: (a) corn borer and (b) bollworm.
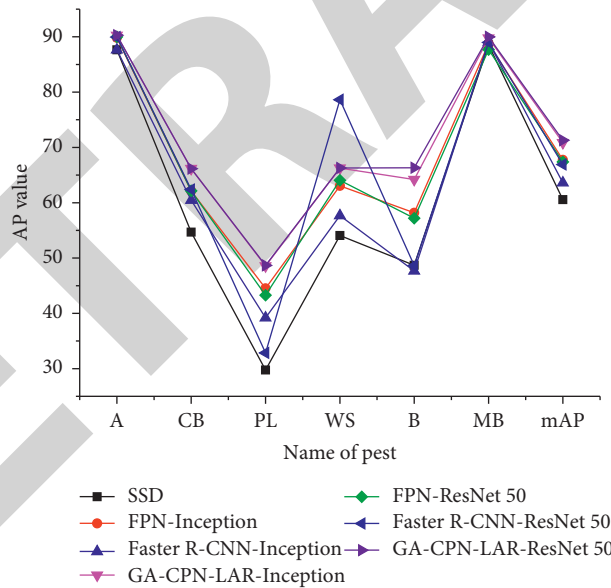
Figure 8: Comparison of several target detection methods' AP values under the AgriPest dataset (A denotes armyworm, CB denotes corn borer, PL denotes plant lice, WS denotes wheat spider, B denotes cotton bollworm, MB denotes brassica, and mAP denotes average accuracy).

recall rate. Its overall changing law shows similar changes and distributions to the MPD dataset.

The results under the MPD dataset and the AgriPest dataset suggest that the proposed CNN-based pest target detection method has a good presentation effect and can significantly reduce the false detections and missed detections, pointing out a good direction recognizing and detecting crop pests in the field environment. Besides, the method has a high detection accuracy. The above results

reveal that the deep learning-based pest detection GA-CPN-LAR method applies to the agricultural data supervision and governance platform.

3.3. Implementation of the Agricultural Data Supervision and Governance Platform. From the blockchain perspective, the GA-CPN-LAR pest target detection method based on deep learning is introduced into the platform. The
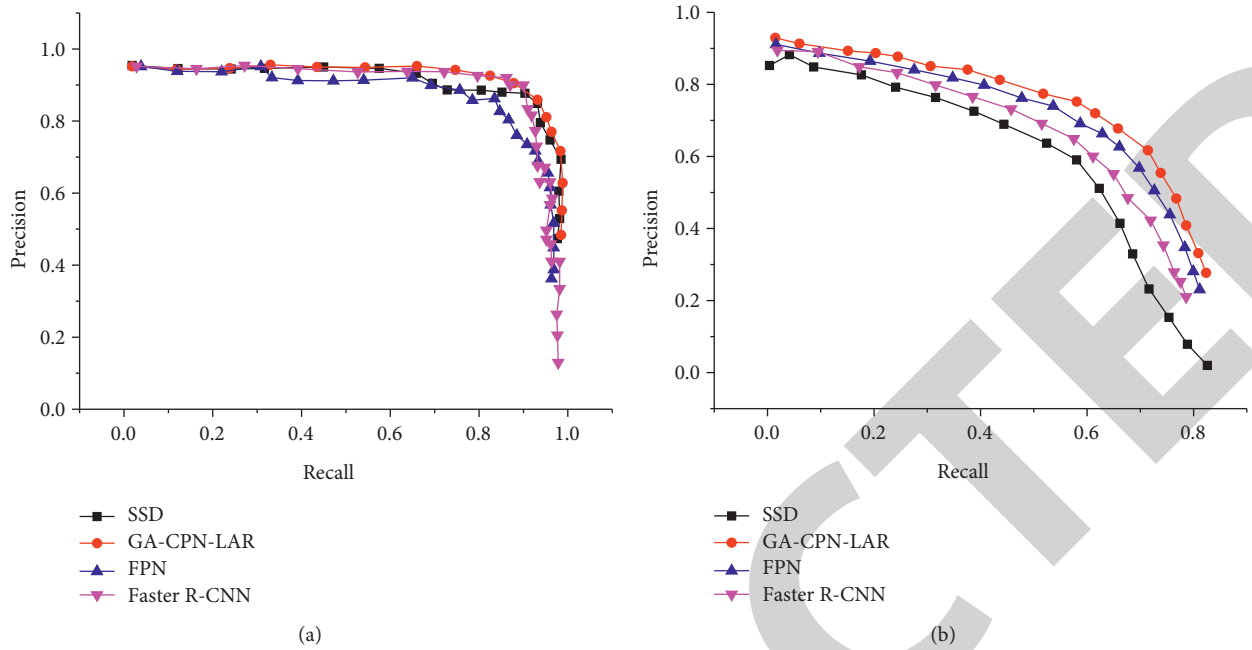
Figure 9: Precision-recall curve based on Inception under the AgriPest dataset: (a) corn borer and (b) bollworm.
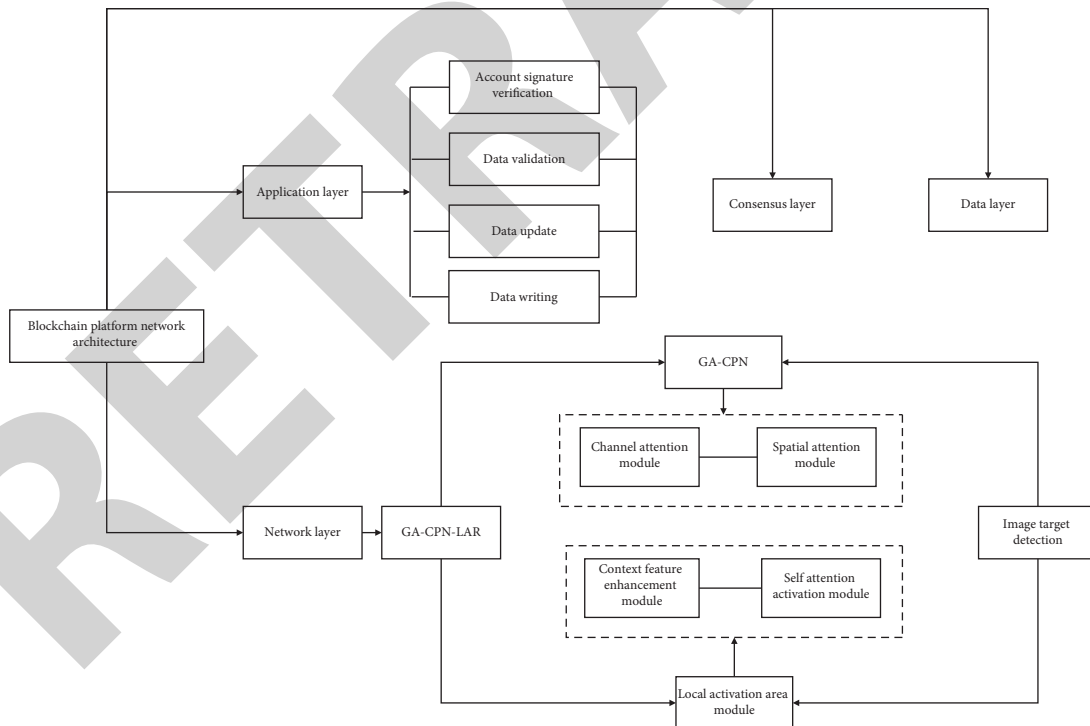
Figure 10: Implementation of the agricultural data supervision and governance platform.

implementation of the agricultural data supervision and governance platform is shown in Figure 10.

This blockchain-based data supervision platform essentially includes the data layer, neural network detection layer, consensus layer, and application layer. Among them, the neural network detection layer is the core. In the process

of agricultural modernization and intellectualization, the agricultural data supervision and management platform is vital for the identification and detection of pests. The pest and disease supervision based on blockchain and deep learning comprehensively considers global and local feature extraction and pattern recognition, which has a positive

impact on promoting the scientization of agricultural data processing and promoting the sustainable development of rural areas. Obviously, blockchain technology and deep learning have great application potential in agricultural data analysis and governance.

4. Conclusions

This work introduces deep learning methods for the design and implementation of agricultural data supervision and governance platforms based on the effectiveness of block-chain technology in network transmission to promote the long-term sustainable development of rural areas. The GA-CPN-LAR pest detection method is put forward. The main conclusions are as follows: (1) With the MPD dataset, GA-CPN-LAR has a higher AP value than other target detection methods, increasing by 4.2%. (2) Compared with the baseline of the MPD dataset, the GA-CPN-LAR method corresponding to two representative pests under the initial feature extractor has higher precision and recall. (3) Under the AgriPest dataset, the Fast R-CNN object detection method performs poorly in detecting pests. In contrast, the AP value of the proposed GA-CPN-LAR deep object detection method outperforms other object detection methods by 3.2%~9.8%. In addition, the results of the MPD and AgriPest datasets show that the CNN-based pest and disease target detection method reported here has a good presentation effect, significantly reducing false detection and missed detection. Therefore, it points out a good direction for identifying and detecting crop pests and diseases in the field environment. Furthermore, the regulation of pests and diseases based on blockchain and deep learning comprehensively considers global and local feature extraction and pattern recognition, which positively impacts the scientization of agricultural data processing and even promotes the sustainable development of rural areas. Therefore, the research results can provide a feasible method for the intelligent and scientific development of agricultural governance.

The agricultural data supervision and governance platform is a very complicated system. However, only pest detection and recognition are analyzed due to the influences of different objective factors. In addition, the size of the selected detection samples is small. Hence, the research samples will be increased to discuss more aspects of agricultural data supervision in future works.

Data Availability

The simulation experiment data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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Retraction

Retracted: An Analysis of Public Environment-Oriented Marxist Philosophy Content Dissemination

Journal of Environmental and Public Health

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] J. Guo and H. Hu, "An Analysis of Public Environment-Oriented Marxist Philosophy Content Dissemination," *Journal of Environmental and Public Health*, vol. 2022, Article ID 7873226, 9 pages, 2022.

Research Article

An Analysis of Public Environment-Oriented Marxist Philosophy Content Dissemination

Jinming Guo [ID] **and Haibo Hu**

Northeast Normal University, Changchun 130024, China

Correspondence should be addressed to Jinming Guo; guojm005@nenu.edu.cn

Marxist philosophy has always been attached to the practice. In the new age, Marxist philosophy needs to solve many problems, such as ecological destruction, environmental pollution, international conflicts, and technical innovation, and improve the integration of the Marxist philosophy system with China's national conditions. The premise of change is practice, and the premise of practice is dissemination. Promoting the dissemination of Marxist philosophy is the cornerstone of solving the blind spot in the process of Marxist philosophy popularization. Because of the development of Internet technology, in order to ensure the validity of the uploaded videos related to Marxist philosophy on the platform, combining the research on human visual perception and the advantages of the long-term recurrent convolutional network (LRCN) model in video content recognition, an attention mechanism-based LRCN model is proposed, which simulates the attention characteristics of the human brain in the deep learning model, considers the video content globally, and makes the attention of the model fall in the effective area of the whole video. The experiment uses HMDB51, UCF101, and YouTube-8M data sets, and the results show that the LRCN model based on the attention mechanism proposed in this paper can effectively improve the accuracy of video content recognition, and it can converge quickly during training to improve the efficiency of model training.

1. Introduction

Marxist philosophy is the inevitable result of social development in the middle of the nineteenth century [1]. It is a theory about the proletariat and human liberation and realizes the unity of materialism and dialectics, materialistic natural view and historical view of materialism, and scientific and revolutionary view on the basis of scientific practice view, thus bringing about a revolutionary change in the history of philosophy. The establishment of Marxist philosophy is a revolutionary change in the history of philosophy [2–4]. The key reason why Marxist philosophy can launch a revolution shaking the history of human thought lies in that it scientifically solves the relationship between man and nature and between man and society based on the viewpoint of practice, thus realizing the unity of materialism and dialectics and materialist view of nature and

materialist view of history. The viewpoint of practice is the primary and basic viewpoint of Marxist philosophy.

Philosophy is not equal to science. Philosophy may represent the views and theories of thinkers of a certain class, but it is not necessarily the true understanding of the objective world [5, 6]. However, philosophy and science are intrinsically related. Any science is to study and grasp a certain law as its own responsibility; philosophy is also with its unique perspective to study and grasp a certain law. As far as Marxist philosophy is concerned, it takes the relationship between man and the world as its object and reveals the general laws of the external world and the movement of human thinking through the reflection of natural science and social science [7–9]. In this sense, Marxist philosophy is science, with strict scientific nature. Marxist philosophy is not only integrated with practical activities but also closely

linked with scientific activities, penetrating into the basic fields of natural and social sciences.

Marxist philosophy not only treats capitalist society with a critical attitude but also treats socialist society with a critical spirit, believing that socialist society is also a society in need of constant reform. Marxist philosophy not only treats other philosophical trends of thought critically but also treats its own theory in a critical spirit and carries on self-criticism [10]. Marxist philosophy never rests on its laurels and regards its own theory as the ultimate system of truth. History has proved that all systems of thought that claim to be the ultimate truth are doomed. Marxist philosophy will not repeat the mistakes of these thought systems. Its fundamental guarantee is that it consciously roots in practice; treats existing things and philosophical thoughts with a critical attitude; treats its theory with a critical spirit; develops its theory creatively with a strong sense of history and responsibility, according to the development of practice and scientific progress; and timely corrects some outdated viewpoints and conclusions proved by practice [11]. The critical nature of Marxist philosophy makes it a continuously developing theoretical system.

Marxist philosophy is inclusive and can be organically combined with the governing thought of any country in the world to continuously enrich and develop Marxist philosophy. It can be seen that Marxist philosophy has the characteristics of learning, guidance, publicity, and communication, but in fact, how to expand the dissemination of Marxist philosophy in the public environment is the issue we study. The age of we-media is the inevitable result of the development of science and technology, with distinct characteristics of the ages. We-media has become an important way for people to exchange information and has a profound impact on information transmission in various fields [12, 13]. In particular, it has a profound impact on the content, way, language, and environment of the dissemination of Marxist philosophy, which is embodied in the following aspects:

(1) We-media has profoundly changed the communication system of Marxist philosophy. The emergence of we-media has enriched the communication form and mode of Marxism, enabling Marxist philosophy to spread through videos, images, and texts and further enhancing the influence of Marxist philosophy. In the practice teaching of Marxist philosophy, we-media can also be used to expand teaching content, enrich teaching means, and enhance the learning interest of the educated. Making full use of the advantages of we-media can further expand the communication channels of Marxist philosophy, especially the application of we-media such as Weibo and WeChat, closely combine the knowledge related to Marxist philosophy with social practical problems, and realize the dissemination of Marxist philosophy through the fan effect. At the same time, we should clearly see that the dissemination of traditional Marxist philosophy still has its own advantages, and we should combine traditional education methods with modern communication methods to jointly enhance the influence of Marxist philosophy.

(2) The interactive advantages of we-media enhance the pertinence of Marxist philosophy communication. The main advantage of we-media lies in that it breaks the limitation of time and space and can realize interactive communication between people. One-to-one, one-to-many, many-to-many, and many-to-one communication can be realized through the we-media platform, which can effectively motivate ordinary people to participate in the dissemination of Marxist philosophy. Supported by big data and cloud computing, data analysis can specify different audiences' needs at different levels and make personalized communication plans according to different audiences' needs. In particular, people at different cultural levels can be divided more scientifically, which can reduce the inconvenience caused by knowledge communication.

(3) We-media age has created a good external communication environment, and it prompts the interaction channel between educators and learners of Marxist philosophy to be more smooth, more accurate, and more timely. At the same time, under the background of the information age, the dissemination of all kinds of information shows explosive growth, especially in the dissemination process of Marxist philosophy; all kinds of information sources are wide; and the quality of information is also different.

In the new media age, the quality of information release is related to the feelings of information receivers. To improve the quality of information release, information publishers often have to make preparations in information selection. In particular, publishing some information on the platform that can cause a big impact on people's ideological field requires the information publisher to prepare for it [14, 15]. When publishing the information about Marxist philosophy theory, we need to consider publishing content, form, and so on. Only when these factors are fully considered can we carry out the specific dissemination of information. Otherwise, even if the relevant information is published on the platform, the actual effect obtained by the users is not obvious and cannot bring some ideological help to the receivers of information. In real life, when many information publishers publish relevant information about Marxist philosophy, they do not have a deep understanding of Marxist philosophy; many concepts have not been deeply studied; and some theoretical knowledge has not been deeply studied. This kind of seemingly unknown state leads to deviations in the understanding of Marxist philosophy among information publishers themselves because the publishers themselves do not have a comprehensive understanding of the information. It is also impossible to mine the essence of Marxist philosophy. For this reason, the credibility of the information published by the information publisher will be reduced; the attraction to the readers will be insufficient; and the interest of the readers will not be aroused, which directly affects the

effective dissemination of relevant information of Marxist philosophy within social groups, that is, the quality of information dissemination. In addition, the relevant works on Marxist philosophy have great difficulty in expressing, which makes it difficult for the information publisher to understand foreign literature [16, 17]. Generally, the information publisher publishes the views of relevant Marxist philosophy in popular and understandable mass language, and there are some problems in understanding the views and concepts. In this case, the effect of theory promotion is not obvious, affecting the spread of Marxism philosophy.

However, the rich and diverse video content of Marxist philosophy poses a great challenge to its supervision and management. Because of the breakthrough of deep learning in intelligent recognition, video content recognition technology based on deep learning has gradually become the main technology in video content recognition and analysis [18, 19]. Therefore, based on deep learning, this paper studies accurate and efficient video content recognition technology by introducing an attention mechanism and making full use of the temporal features of the video.

The contribution of this paper is that an attention-mechanism-based long-term recurrent convolutional network (LRCN) model is proposed for illegal Marxist philosophy video recognition. The rest of the paper is structured as follows. In Section 2, we study the LRCN model. Attention-based LRCN model is proposed to recognize illegal Marxist philosophy videos in Section 3. Experimental results are reported in Section 4, and Section 5 gives the conclusion of this paper.

2. LRCN Model

In recent years, with the deepening of deep learning, breakthroughs have been made in machine translation, speech recognition, computer vision, and other fields. With the help of the study of attention characteristics of the human brain, the introduction of attention mechanism into deep learning has become a research hotspot in the field of deep learning. Similar to the human visual system, the human eye does not focus on the whole image, but instead focuses on more interesting or important areas. Although it needs to be viewed as a whole, it still scans the image in a certain order, moving from one area to another. Therefore, it is helpful to understand and analyze video content by simulating the attention characteristics of the human brain in the video content recognition method based on deep learning.

Video data is a kind of three-dimensional data, which contains not only spatial information but also temporal information. Although convolutional neural networks (CNN) can extract robust spatial features and represent the spatial information of the video, they cannot deal with the sequence problem, extract the temporal features of the video, and represent the temporal information of the video. The recognition method based on the three-dimensional convolution kernel and the recognition method based on the two-channel CNN have improved the recognition effect compared with the recognition method based on the single frame [20]. Therefore, the temporal feature of the video plays an important role in

video content recognition. However, both the recognition method based on the 3D convolution kernel and the recognition method based on dual-channel CNN only consider the video content of several consecutive frames when extracting the temporal features of the video, but for long content, more video frame information needs to be used to extract the temporal features of the video in a long time range. LSTM network is a network related to the output of the current moment of the sequence and the output of the previous moment, which can remember the state information of the sequence in a long time range [21]. Integrating CNN and LSTM networks, the CNN extracts the spatial features of video, while LSTM networks extract the temporal features of video over a long period of time and make use of complementary spatial and temporal features to recognize video content, which is helpful to the understanding and analysis of video content.

LRCN model consists of two parts: spatial feature extraction and temporal feature extraction [22]. The CNN is used to extract the spatial feature vectors of original video frames and send them to temporal feature extraction. LSTM networks are used to extract temporal feature. LSTM networks extract corresponding temporal features from the input spatial feature vectors and send them to the classifier to get the final recognition results.

3. Attention-Mechanism-Based LRCN Model

Due to the attention characteristic of the human brain, when faced with complex and diverse video content, especially the video content related to Marxist philosophy, the manual detection method always has high accuracy compared with other video content recognition methods. Studies have shown that one of the important properties of human visual perception is that people do not process the whole image at the beginning. Instead, they selectively focus their attention on certain visual areas and combine information from different areas to construct an internal representation of the whole image, guiding human eyes to move in the image and make decisions. LRCN model adopts the structure of CNN and LSTM networks, which cannot only capture the spatial information of video content but also capture the temporal information of video content for a long time. However, the LRCN model only takes a single video frame as input at each moment, without considering the influence of the complete video sequence on video content recognition.

Venugopalan uses a codec structure to automatically generate video descriptions [23]. The encoding part extracts video features, and the decoding part generates video description. Unlike traditional video processing methods, the model takes all video frame sequences as inputs at the same time, instead of only inputting one video frame at each moment. The input of the model is defined as follows:

$$T(v) = \frac{1}{K} \sum_{i=1}^{K} v_i, \tag{1}$$

where v_i represents the feature vector of the i-th video frame.

The model takes all video feature vectors as inputs and pays attention to the whole video sequence information at any time, but this average way makes the video lose temporal structure

information, and all video frame sequences are treated equally, which makes it impossible to distinguish useful information from interference information in the whole video. For example, a video of Marxist philosophy may contain preparatory activities, Marxist philosophy, and some words, while only the content of Marxist philosophy is directly related to the theme of teaching. Therefore, when recognizing the content of the Marxist philosophy video, the model should pay more attention to the video frame sequence of teaching.

Then the attention mechanism is introduced into the model to make the model pay attention to the whole video frame sequences, especially the video frame sequences related to the teaching of Marxist philosophy, which is helpful for recognition of Marxist philosophy video content.

CNN extracts robust spatial features and obtains fixed-size feature vectors. LSTM networks recognize video content according to input feature vectors. Therefore, CNN is regarded as an encoding network and LSTM networks as an decoding network, and an attention mechanism is introduced in the decoding process to learn attention weight. So that the model's attention falls on the effective area of the whole video, and the interference of irrelevant information to the Marxist philosophy video content recognition is eliminated, so as to extract the temporal feature with attention to identify the Marxist philosophy video content.

In the decoding process, feature vectors of whole video frame sequences are weighted as the input of the LSTM network, which is shown as follows:

$$T(v) = \sum_{i=1}^{K} w_i^t v_i, \qquad (2)$$

where w_i^t is the weight to be learned and $\sum_{i=1}^{K} w_i^t = 1$. w_i^t reflects the tightness of the feature vector of the i-th frame and the set of feature vectors of the whole video at time t. If the content of the video frame is more related to the content of the whole video, the weight of attention will be larger.

The learning of w_i^t is related to the hidden unit state of LSTM networks at the last moment and the feature vector at the current moment, and the correlation score of w_i^t is shown as follows:

$$s_i^t = \tanh\left(\mathbb{W}h_{t-1} + \mathbb{A}v_i + b\right), \qquad (3)$$

where h_{t-1} is the state of the hidden unit at time $t-1$, $\mathbb{W}$ and $\mathbb{A}$ are the weight matrix to be learned, b is the bias parameter, and tanh () is the activation function [24].

The LRCN model based on the attention mechanism makes the LSTM networks selectively pay attention to the effective information in the video and reduce the interference of invalid information by learning the attention weight. The structure of the LRCN model based on the attention mechanism is shown in Figure 1.

4. Experimental Results and Performance Analysis

4.1. Setup. In the LRCN model based on the attention mechanism, the process of video content recognition mainly includes four steps: video preprocessing, spatial feature extraction, attention-based temporal feature extraction, and video content prediction of illegal Marxist philosophy.

(1) Video preprocessing. At first, the data set is divided into a training set and a test set. Then, FFmpeg is used to decode the raw video stream into a sequence of video frames [25]. Each type of video has a unique identifier, numbering from 0. Different identifiers represent different video categories. Since a video clip may contain hundreds of video frames, but there is a lot of redundant information between these video frames, it is necessary to extract the key frames of these video frames before the model training and divide the video content into different video clips as input of the model. The video clips divided from the same video have the same video identification. During training, every 16 frames of video content are divided into 1 video clip, and during testing, every 8 frames of video content are divided into 1 video clip, with 8 frames of the same video content between the adjacent 2 video clips.

(2) Spatial feature extraction. In the LRCN model based on the attention mechanism, the video frame sequence is first input into CNN to extract the spatial feature vector. Since the feature of the fully connected layer is a high-level semantic feature, the original spatial structure information of the video content has been lost. To ensure that the subsequent LSTM networks contain more original spatial information of video content when extracting temporal features, this paper extracts the pooled feature vector corresponding to the feature graph of the last convolutional layer in the CNN as the spatial feature vector.

(3) Attention-based temporal feature extraction. Since the sequence of video frames contains the temporal information of the video, the spatial feature vectors of the video are weighted and then input into the LSTM networks. The attention weight of each moment in the LSTM networks is calculated by the LSTM unit state of the last moment and the input of the current moment, and the attention-based temporal feature is extracted.

(4) Video content prediction of illegal Marxist philosophy. LSTM network takes the continuous video spatial feature vectors as input, and the extracted temporal features contain not only the spatial information of video content but also the temporal information of video content. The attention-based temporal features extracted by LSTM networks at every moment are input to the classifier for prediction, and the corresponding probability output is obtained. The category corresponding to the maximum value in the output probability is selected as the input video category and compared with the preset feature library, so as to recognize the illegal Marxist philosophy video content.
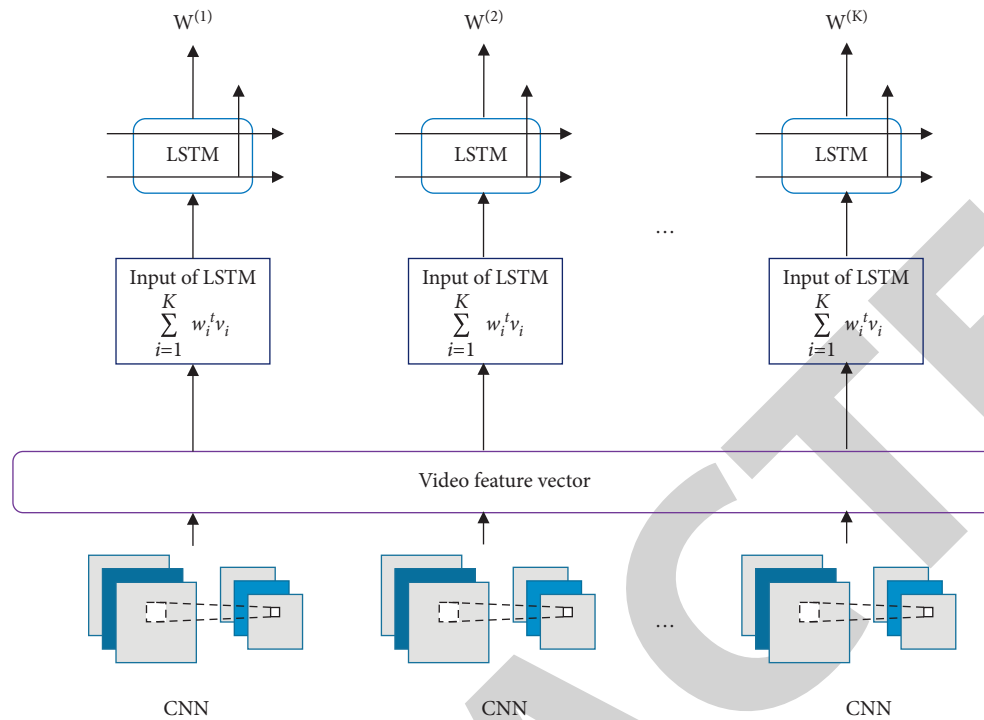
FIGURE 1: Architecture of attention-mechanism-based LRCN model.

4.2. Experimental Environment

4.2.1. Data Sets.
In this paper, HMDB51, UCF101, and YouTube-8M are selected as data sets used in the experiment [26]. The content of the HMDB51 data set mainly comes from movie clips, which contains 6,766 videos divided into 51 action categories. Seventy videos are selected for each category as training videos and 30 videos as test videos. The UCF101 data set is one of the most challenging video content recognition data sets so far, which contains 13,320 videos in a total of 101 video categories, including 9,537 videos as training sets and 3,783 videos as test sets. All videos are decoded by FFmpeg at 30 fps with a resolution of 320×240. The YouTube-8M is a large-scale dataset that contains 350000 hours of video and 2.6 billion audio/visual features. Since there are relatively few videos related to Marx's philosophy, this paper adjusts the video content to be recognized as the video content related to philosophy.

4.2.2. CNN.
The CNN adopts the GoogLeNet model and is pretrained on ImageNet 2012 image recognition library. ImageNet data set is currently the largest image recognition database, containing 14 million images and covering the common things in life categories. ImageNet 2012 classification data set is a subset of the ImageNet data set, selecting 1,000 categories. The video features extracted from the pretrained GoogLeNet model can effectively represent the spatial information of the video content. When training the LRCN model based on the attention mechanism, the parameters of the GoogLeNet model do not participate in the training, and the feature map of the last convolutional layer

is extracted and pooled as the spatial feature of the video. The feature size is 2,048 dimensions.

4.2.3. LSTM.
The number of LSTM network layers is set to 1; the number of input units is 2,048; and the number of hidden units is 512. According to different data sets, the number of output units is 51 or 101. Adam optimization algorithm is used to train the LRCN model based on the attention mechanism. The initial learning rate is set to 0.001, and the maximum number of iterations is set to 20,000.

4.3. Performance Analysis.
This paper compares the recognition accuracy of the LRCN model based on the attention mechanism with different video content recognition methods such as VWF [27], WSL-CVCR [28], and ACSL [29] on HMDB51, UCF101, and YouTube-8M data sets, respectively, and the comparison results are shown in Figure 2. The comparison methods are summarized as follows:

(i) VWF is a new method of human action recognition using video and Wi-Fi clues

(ii) WSL-CVCR is a weak supervised learning framework and a new component-based video content representation method

(iii) ACSL is an attention-based consistent semantic learning method

As can be seen from Figure 2, on the HMDB51 data set, the LRCN model based on the attention mechanism proposed in this paper focuses attention on the temporal order of video frame sequence, with higher recognition accuracy
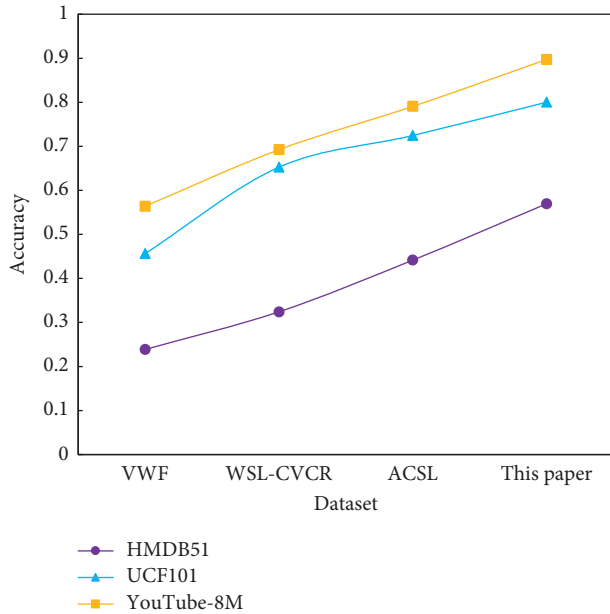
Figure 2: Recognition accuracy of different video content recognition methods on HMDB51, UCF101, and YouTube-8M data sets.

Figure 3: Recognition accuracy of 4 models in 10 actions on HMDB51 data set.

than the other three baselines. Due to the spatial features extracted by CNN, the spatial information of video content can be represented. Therefore, in the process of video content recognition, it is more important to focus the model's attention on the temporal information of video content than on the spatial information of video content. On the UCF101 data set, the proposed model uses weighted video space feature vectors as the input of the LSTM network to extract attention-based temporal features, and the recognition accuracy is high. Therefore, in the process of video content recognition, the attention characteristics of the human brain are simulated so that the model's attention falls on the effective area of the whole video, and the interference of irrelevant information is excluded, which is conducive to the understanding and analysis of video content and the improvement of recognition effect. On the YouTube-8M data set, each algorithm has achieved higher accuracy. This is because every video in the YouTube-8M data set is public, and each video has at least 1,000 frames. Although the amount of video is very large, to reduce the storage cost and computation time, Google provides precomputed and compressed features so that the model training can be completed in a day on a single computer.

The HMDB51 data set contains 51 different categories of videos, each of which contains 30 test videos. The UCF101 data set contains 101 different categories of videos, with a total of 3,783 test videos, while YouTube-8M contains more videos in different categories. To further analyze the recognition effect of the LRCN model based on the attention mechanism on each category of video content, we select 10 categories of video content from each data set for the targeted test. This paper compares the recognition accuracy of the four models in different categories of video content in HMDB51, UCF101, and YouTube-8M data sets, and the comparison results are shown in Figures 3–5, respectively.
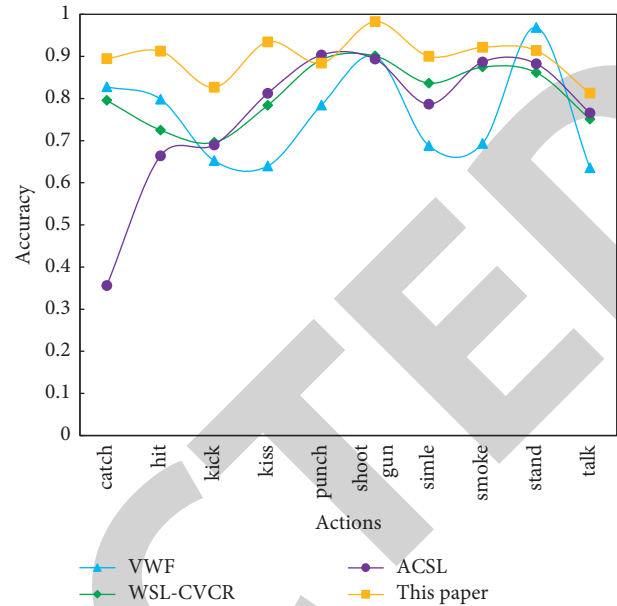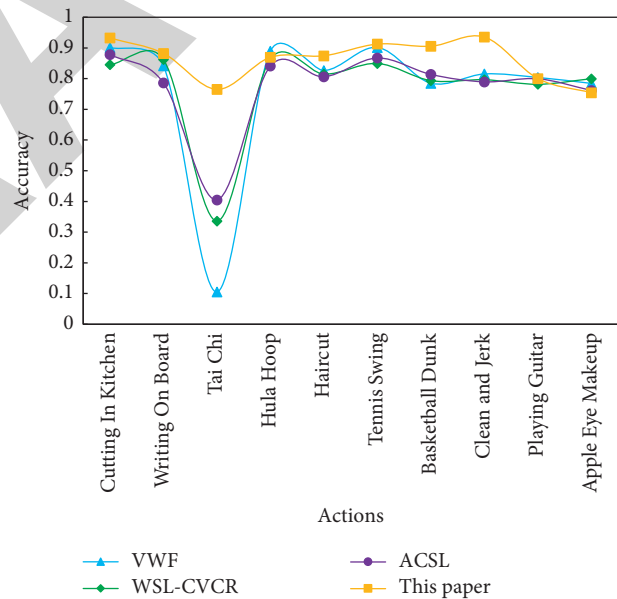
Figure 4: Recognition accuracy of 4 models in 10 actions on UCF101 data set.

The video content of the HMDB51 data set includes five categories: facial-related actions, facial actions related to object interaction, body-movement-related actions, body movements with objects, and human-interaction-related actions. As can be seen from the statistical results in Figure 3, compared with the other three baselines, the recognition accuracy of eight categories of the LRCN model based on the attention mechanism is higher than that of the baselines. Among them, the recognition accuracy of the LRCN model based on the attention mechanism is much higher than that of the baselines for the categories of video content such as hit, kiss, shoot gun, talk, and smoke. In this kind of video, the

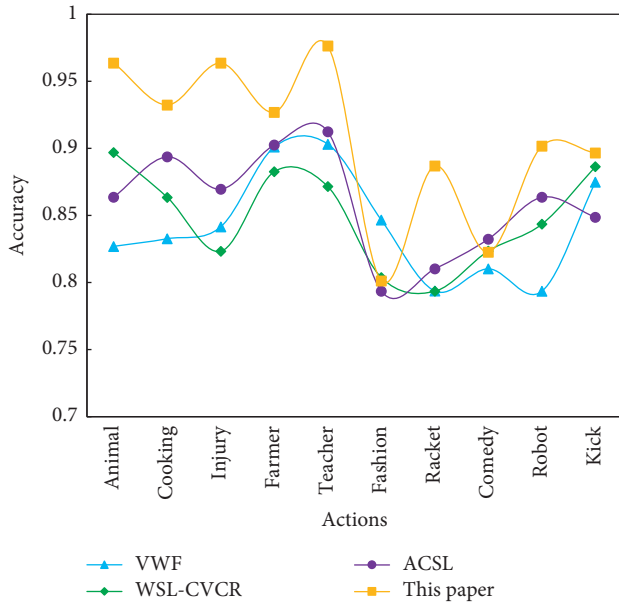FIGURE 5: Recognition accuracy of 4 models in 10 actions on YouTube-8M data set.

FIGURE 6: Recognition accuracy of 4 models in Video lesson entity on YouTube-8M data set.

FIGURE 7: Recognition accuracy of 4 models in Teacher entity on YouTube-8M data set.

video content involves the human body's action interaction or the action amplitude is small, and the video content does not change much. Therefore, in the process of video content recognition, it is necessary for the model to focus on the video frame sequence related to the video theme. Meanwhile, the LRCN model based on the attention mechanism has a slightly lower recognition accuracy for stand, punch, and other categories of video content than other models, because the action of this kind of video content is ambiguous. Therefore, the LRCN model based on the attention mechanism treats video frame sequence equally, but its recognition effect is inferior to other models.

The video content of the UCF101 data set covers five categories: human movement, human-object interaction, human-human interaction, playing musical instruments, and sports. As can be seen from the statistical results in Figure 4, compared with the other three baselines, the recognition accuracy of four categories of the LRCN model based on the attention mechanism is higher than that of the baselines, and the recognition accuracy of two categories is equal to that of the other models. Hammering, tennis swing, basketball dunk, clean and jerk, and other categories are recognized more accurately by the LRCN model based on attention mechanism than by baselines, especially for hammering category videos. The recognition rate of the other three baselines is very low, and some models could not even recognize it, while the recognition accuracy of the LRCN model based on the attention mechanism is 76.51%. This type of video content is Tai Chi. Due to the small hand movements, the spatial and temporal information of video is lost during the long-term recognition of the model. However, the attention-based LRCN model can still focus the model on the video frame sequence related to the video subject during the recognition process, thus effectively recognizing the video content. Similar to the recognition
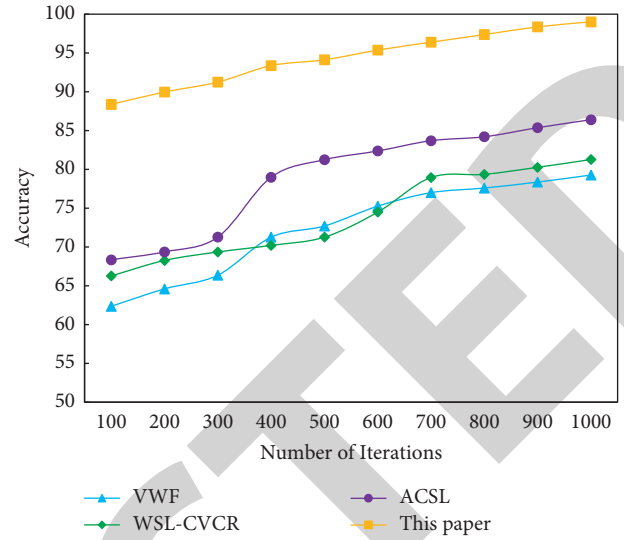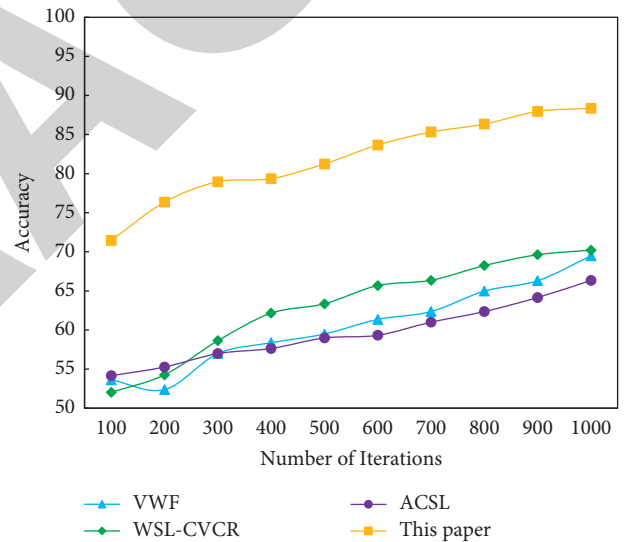
effect of the HMDB51 data set, the LRCN model based on the attention mechanism is not as effective as the basic model in recognizing ambiguous video content. As can be seen from Figure 5, the accuracy of all models on all entities in the YouTube-8M data set is very high. However, for unknown labels or some special labels, the accuracy of all models is not very high.

In particular, to verify whether the videos of Marxist philosophy on the platform are illegal, we use the video lesson and teacher entities related to YouTube-8M to conduct iterative training on the proposed model, so as to verify the accuracy. As can be seen from Figure 6, with the increasing number of iterations, the LRCN model based on the attention mechanism proposed in this paper maintains high accuracy of more than 90% for the video lesson entity in the

YouTube-8M data set. This shows that the current content of Marxist philosophy is mainly transmitted in the form of lessons. As can be seen from Figure 7, with the increasing number of iterations, the training effect of all models on the teacher entity in the YouTube-8M data set is not very good because it is easy to be mistaken for other roles. But, even so, with the increasing number of iterations, the accuracy of the model proposed in this paper is also improving, basically above 80%. To sum up, the model proposed in this paper has achieved high accuracy in 2,981 videos of two entities, which can accurately and timely judge whether Marxist philosophy on the platform is illegal or not, providing a good environment for the dissemination of Marxist philosophy content.

5. Discussion

In this paper, we analyze the dissemination of Marxist philosophical content in the public environment. Based on the research of human visual perception, we propose to simulate the attention characteristics of the human brain in the deep learning model and make the model's attention fall on the effective area of the whole video in the process of illegal Marxist philosophy video content recognition, so as to eliminate the interference of irrelevant information on video content recognition. The LRCN model based on the attention mechanism takes weighted video spatial features as input of the LSTM network and focuses on the video frames related to the video theme in the long recognition process. Through training and testing on HMDB51, UCF101, and YouTube-8M data sets, the recognition accuracy of the LRCN model based on attention mechanism in various categories of video is analyzed. However, it is necessary to enhance the affinity and pertinence of Marxist philosophy communication in the public environment.

The affinity of Marxist philosophy can enhance the attraction of Marxist philosophy, while the pertinence of Marxist philosophy can enhance the effectiveness of Marxist philosophy, solve various problems in practice, and enhance the identity of the educated. Therefore, in order to spread Marxist philosophy more widely and meaningfully, we must enhance the affinity and pertinence of the spread.

Enhancing the affinity and pertinence of the dissemination of Marxist philosophy reveals the essence of Marxist philosophy. Marxist philosophy itself is an important science with humanity, which plays an important role in promoting national economic and social development. Therefore, it is necessary to strengthen the dissemination of Marxist philosophy. To realize the goal of educating people, in the process of disseminating Marxist philosophy theory, it is necessary to transfer the humanistic care and the spirit of educating and loving. Disseminators should further highlight the humanistic nature of Marxist philosophy by enhancing affinity and pertinence, form a harmonious and close dissemination atmosphere, and constantly stimulate the enthusiasm and initiative of learning.

Enhancing the affinity and pertinence of Marxist philosophy can better understand the dialectical relationship between subject and object. The dissemination of Marxist philosophy emphasizes the equal relationship between subject and object, and the status between subject and object is interactive and equal in the dissemination of Marxist philosophy. Especially in the age of we-media, it provides an interactive platform for the dissemination of Marxist philosophy, eliminating factors such as rank and inferiority in the dissemination process. In practical interaction, if the disseminator and receiver of Marxist philosophy can have more affinity, it is bound to improve the dissemination effect of Marxist philosophy and also help realize the infiltration of theory and the output and establishment of value in the process of interaction between subject and object. To further understand the dialectical relationship between subject and object of Marxist philosophy, it is necessary to formulate practical dissemination programs according to the different characteristics and personality differences of the receivers, inspire the receivers with sincerity so that the receivers can be respected as far as possible in the whole dissemination process, and dare to interact with the disseminators, so as to imperceptibly disseminates Marxist philosophy theory in a warm and harmonious atmosphere.

Enhancing the affinity and pertinence of the dissemination of Marxist philosophy is the inevitable requirement of Marxist humanism. Under the background of the we-media age, people's values are being impacted by diversified social trends of thought, especially under the background of the market economy, people's thoughts and behaviors are changing from following traditional ideas to following the direction of fairness and equality. However, Marxist philosophy is just the value guidance to correct, solve, and adapt to the development of the times. Affinity and pertinence of Marxist philosophy are better able to respect and care for the educated, solve problems in their real lives, gradually enhance the recognition and participation in Marxist philosophy, and sublimate their values and ideal beliefs through continuous interaction with Marxist philosophy.

Data Availability

All data used to support the findings of the study are included within the paper.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Research Article

International Criminal Law Protection of Environmental Rights and Sentencing Based on Artificial Intelligence

Jiaxin Wu,[1] **Heyong Wang** (ID)**,**[2] **Ning Sun,**[1] **Hongwei Wang,**[1] **and Danila Tatarinov**[2]

[1]*Harbin Institute of Technology, Harbin 150001, China*
[2]*Al-Farabi Kazakh National University, Almaty 050000, Kazakhstan*

Correspondence should be addressed to Heyong Wang; su_minchzhe2@live.kaznu.kz

Environmental problem is an international problem that transcends national boundaries and develops into regional and global environmental pollution and ecological problems. Facing the increasing environmental pollution, the international community has successively formulated many relevant environmental pollution prevention laws, but the world situation is complicated after all, environmental problems still emerge endlessly, and the protection of environmental rights has become the consensus of the international community. Environmental right is an integral part of human rights, and protecting environmental right is the concrete expression and proper meaning of protecting human rights. Using international criminal law to protect environmental rights will play a positive role in global environmental protection. As with the development of computer technology, the research of machine learning has gradually transferred to the field of social science, especially the judicial field. While sentencing is a crucial part of environmental crime, this paper studies the sentencing of environmental rights cases from the perspective of international criminal law and uses Convolutional Neural Networks (CNN) to determine the sentencing of environmental rights cases. Through the experiment on the Integrated Database (IDB) dataset, the results show that the introduction of CNN improves the effect of the sentencing term prediction model and the fine prediction model significantly. The CNN-based model scored 91.6542 in the sentencing term prediction model and 90.8890 in the fine prediction model.

1. Introduction

International criminal law is generated and developed in the process of the international community fighting against international crimes, which is an important force in fighting international crime [1]. In recent years, there are two trends deserving attention in the development of international criminal law. On the one hand, the international community has continuously expanded and developed new fields of international cooperation in controlling international crime by concluding international criminal law conventions, stipulating new measures for controlling international crime, such as measures for controlling money laundering crime and measures for controlling corporate crime. On the other hand, these international criminal law conventions have begun to focus on the coordination between the basic principles of international law and specific rules,

emphasizing that all states parties should abide by the basic principles of the Charter of the United Nations, such as "the sovereign equality of States" when performing their obligations under the conventions, and explicitly putting forward the provisions of "the protection of human rights" [2, 3]. Environmental right is an integral part of human rights. Therefore, protecting environmental right is an important task of human rights protection. International criminal law is the backbone of the fight against international crimes; it is generally believed that international criminal law should do something in the protection of environmental rights. Under the current international situation, it is the direction of environmental protection work to make full and reasonable use of international criminal law to protect environmental rights [4–6]. However, there are a few discussions on the protection of environmental rights in international criminal law.

Environmental right is generally defined internationally as the right to a good environment. However, this concept is in the process of being developed and there is no exact definition so far [7]. We believe that the environmental right is the right of harmonious coexistence between people and nature. Environmental problem is a social problem generated by modern capitalist mass production. Especially after World War II, with the economic development of major capitalist countries, environment and even environmental rights became an important topic of government policy. In Germany and the United States, environmental rights were discussed in the 1960s [8]. Environmental right was first defined by the Environmental Right Research Institute of Osaka Law Association of Japan as a pioneer of international environmental conference. It is believed that environmental right is the right to enjoy a good environment and control it [9]. In 1972, the United Nations held a conference on the Human Environment in Japan, and adopted the first principle of the Declaration on the Human Environment, which stipulates that everyone has the basic right to enjoy freedom, equality, and adequate living conditions in a good environment, and has the responsibility to protect and improve the environment for the present and future generations.

With the proposal and development of the environmental right theory, many countries and international organizations around the world have started relevant legislative activities. In the process of legislative practice, an inevitable problem is the division of environmental rights [10, 11]. We divide environmental rights into the following categories according to relevant environmental law theories: (1) Environmental rights of natural persons. Some scholars refer to a natural person's right to a healthy and living environment. (2) Environmental rights of legal persons and other organizations. It includes the legal right of legal persons and other organizations to utilize environmental resources and the right to discharge pollutants legally in the production process. (3) State environmental administrative power. Some scholars call this the national environmental right, which we do not think is appropriate because as the embodiment of public power, the state is mainly responsible for protecting natural resources and preventing air pollution, which is obviously a kind of power. We know that rights can be waived and that power cannot be "freely disposed of." (4) Human environmental right. It refers to the right of good ecological environment that human beings as a whole should enjoy on the earth.

Although international environmental crime has not been comprehensively stipulated by international criminal law conventions, in view of the strong demand of the international community to bring violations of international environmental law into the international criminal system, international environmental crime as a major type of international crime is also a general trend, and how to its sentencing has become the focus of research [12]. In recent years, research progress on machine learning and deep learning in the field of natural science is in full swing. With the continuous development of computer technology, the research on machine learning has been gradually transferred to the field of social science, especially the judicial field. In traditional judicial judgments, the determination of sentencing often takes a lot of time and manpower, resulting in certain pressure on case trial judgments [13–15]. Therefore, the introduction of machine learning-assisted sentencing can effectively relieve this pressure, but the application of computer technology in the field of sentencing is not enough at present.

Our contributions are summarized as follows:

(i) We use convolutional neural networks (CNN) to determine the sentencing term and fine of environmental rights cases from the perspective of international criminal law.

(ii) We analyze the protection of environmental rights under international criminal law.

The rest of this study is organized as follows. Section 2 reviews related work. In Section 3, CNN-based sentencing term and fine research of environmental rights cases under international criminal law is presented. Experimental results and analysis are presented in Section 4. Section 5 concludes this paper.

2. Related Work

Machine learning is the most common application of Artificial Intelligence (AI), which is the ability of computer systems to learn itself by analyzing large datasets and pattern recognition. Machine learning can draw conclusions and preprocess them based on probability, which is applicable to some data. In the long run, the application of AI in legal practice is unlimited, but currently it is commonly used in contract review, legal research, and results prediction. In [16], the author studied the relationship between AI technology and the rule of law, emphasizing that the rule of law was a mechanism of human prosperity. In [17], the author discussed the legal and rule-of-law assumptions and compared them with the assumptions of computing systems to illustrate the extent to which artificial legal intelligence provided responsible innovation in legal decision-making. In [18], the authors combined AI and deep learning algorithm in teaching design to enable students to carry out personalized learning tasks with pertinence, which was of great significance to cultivate high-level legal professionals. In [19], the author proposed to design and construct a data mining-based intelligent information acquisition system for cyber-economic crime using sensors and other technologies to realize the convergence of cyber-economic crime intelligence. In [20], the authors tried to establish a comprehensive scientific concept on the law of using AI in higher education and discuss the possibility of imposing civil sanctions on AI operations in the field of education.

Many strategies have been proposed for environmental right and sentencing. In [21], the author proposed a new type of norm integration and took human rights and environmental norms as examples to discuss the problem of norm integration. In [22], the author made a descriptive and normative economic analysis of international environmental rights. The link between environmental rights,

environmental protection, and the courts has become increasingly prominent in recent years; in [23], the author attempted to determine the role of courts in efforts to protect the environment only on the basis of some case law. In [12], the authors studied the transformation from uncertain sentencing policy to decisive sentencing policy and the use of sentencing guidelines. In [24], the authors studied the role of sentencing guidance influence heuristics in shaping sentencing decisions through three methods. In [25], based on the data of hundreds of criminal cases in a county court in 2015, the authors studied the impact of legal and extrajudicial factors on sentencing results. In [26], the author presented some important problems on the different systems of sentencing procedures. In [27], the author studied the problem that using AI as an assisted system and machine learning algorithm might help suppress the sentencing difference between judges.

To the best of our knowledge, there is almost no application of AI to the protection of environmental rights from the perspective of international criminal law. In terms of sentencing, AI is not applied too. Therefore, based on AI, this paper studies the international criminal law protection of environmental rights and its corresponding sentencing issues.

3. CNN-Based Sentencing Term and Fine Research of Environmental Rights Cases under International Criminal Law

3.1. Basic Structure of the Model. This paper mainly considers the study of environmental rights cases in international criminal law and the term and fine in the sentencing system. Machine learning-assisted sentencing refers to predicting the specific value of term and fine in a given case through modeling under the condition of the fact text. Since it is difficult to find the factual case text of international criminal law protecting environmental rights, therefore, we use the Federal Court Cases Integrated Database (IDB) provided by the Federal Judicial Center for experiments. The IDB has case data of criminal, civil, appellate, and bankruptcy cases.

At first, data preprocessing is performed on the case text in IDB, and the English text is segmented by identifying space based on the case text data cleaning. Then, the text features of the case text data are analyzed, from which high-frequency words and low-frequency words are obtained. On this basis, the text data after word segmentation are cleaned and filtered, and the text word vectors are constructed based on Word2Vec. Finally, according to the word vector, the corresponding prediction model of sentencing and fine of environmental rights cases is constructed, the evaluation system of the model is constructed to evaluate the model according to the distribution characteristics of sentencing and fine, and some conclusions are obtained from the evaluation results of the model.

Generally, when using CNN for text analysis, the input layer inputs the text directly and then the embedding layer constructs the word vector. In this study, the basic CNN model has been modified slightly, and the embedding vector

pre-trained by Word2Vec is input directly into the network. However, the application of Word2Vec in a CNN model is different from the averaging of all word segmentation in the machine learning model. It directly converts the text after word segmentation into a numerical matrix, i.e., each case text is expressed into a numerical matrix for later model building.

CNN is one of the most widely popular deep learning algorithms, and it can achieve a good learning effect on many tasks. CNN can use its unique structure to analyze the text and discover the hidden information in the text. Especially on the premise of large-scale data, CNN is more suitable for text analysis than traditional machine learning methods [28]. This paper attempts to build a sentencing prediction model and a fine prediction model through CNN.

Figure 1 shows the basic structure of CNN used in this paper in analyzing and processing the text of environmental rights cases. It is a two-dimensional word vector matrix of $k \times n$ obtained by the Word2Vec method at the input layer, where k represents the length of a case text composed of words $k_1, k_2, k_3, \ldots, k_i$, and n represents the word vector dimension of each word. Afterwards, the collection and extraction of vector feature information are mainly carried out in the convolutional and pooling layers, and then the features extracted in the previous steps are output through the fully connected layer. Finally, the prediction effect of the model can be obtained through the output layer. In this way, the corresponding model of CNN for predicting sentencing and fine is built.

3.2. Framework for the Model. On the basis of the schematic diagram shown in Figure 1, the functions of each layer in CNN and the specific method in this paper are introduced emphatically.

3.2.1. Input Layer. In this paper, the input of CNN is the word vector matrix processed by Word2Vec, and the output is the sentencing and fine of each environmental rights case. Before constructing the word vector, it is necessary to process the dataset filtered by word segmentation. In the IDB dataset, 20000 words are reserved after word segmentation. Considering that each text has a large length gap after word segmentation, the text length is limited to 400. Text length with less than 400 is supplemented with 0, and text length with more than 400 is truncated. After fixing the length of each text to 400, the environmental rights case text after segmentation needs to be transformed into a vector representation. The dimension of word vector in Word2Vec is set as 400. Since each row in the matrix represents a word particle, the case after each word segmentation becomes a matrix of $400 * 400$, and then the vector matrix is input into the network for training.

3.2.2. Convolutional Layer. It can be seen from the operation of the input layer that the environmental right case text is input in the convolutional layer in the form of a two-dimensional matrix, and the feature information in the case

k_1

k_2

k_3

$\vdots$ $\vdots$

k_i

Word vector
representation

Convolutional
layer

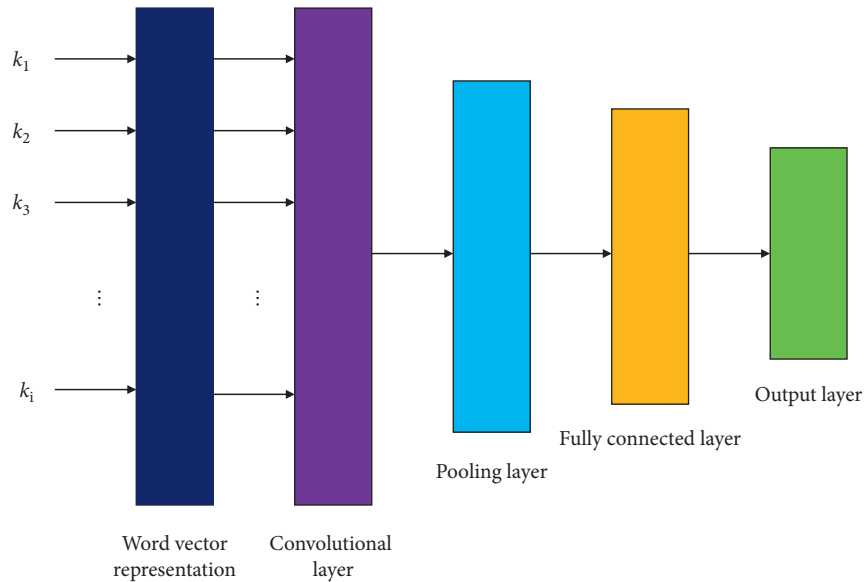Pooling layer

Fully connected layer

Output layer

FIGURE 1: CNN structure diagram.

text can be extracted by the convolution operation in the convolutional layer. In addition, in convolution operation, the selection of an activation function is also very important. In this paper, the Rectified Linear Function (ReLU) function that can accelerate the convergence speed in training the case text word vector data is selected.

3.2.3. Pooling Layer. After obtaining the text features of environmental right cases through convolution operation, if these features are directly used for the regression prediction of sentencing, the calculation amount will be too large due to the large amount of feature data, and the training process will be relatively slow. On the premise of fully retaining useful features, to simplify the number of parameters of CNN and reduce the computational complexity, it is necessary to compress and merge the features of case texts with similar semantics in the pooling layer, which is equivalent to extracting features again and filtering some useless features to meet the requirement of reducing the number of parameters in the model. Common pooling methods are average pooling, maximum pooling, and random pooling, and maximum pooling is used to preserve more features.

3.2.4. Fully Connected Layer and Output Layer. The pooling structures are aggregated in the fully connected layer. In Keras, the connections between neurons in the fully connected layer are dense, and this layer is defined as the Dense layer in order to represent this relationship [29]. We define the fully connected layer through the Dense function to obtain the final feature vector of environmental rights case text, which is input into the final output layer to obtain the final prediction results of the sentencing term and fine.

4. Experiment and Results Analysis

4.1. Parameters' Setting. In the construction of CNN, parameters involved in the model need to be set through

analysis, including the text length of the environment right case text input to the CNN, the size of the dictionary constructed by the case text, the dimension of the word vector, the size of the convolution kernel of the CNN, the value of the Dropout parameter, and the number of iterations of training CNN.

Earlier in the paper, it has been known that the length of text of environmental rights cases should be set to 400 in terms of sentencing and fine prediction. In the IDB dataset, 20000 words are reserved after word segmentation. For other parameter settings, generally speaking, the more dimensions of word vector constructed by the case text, the better the prediction effect of the corresponding model. However, if the word vector dimension continues to increase, the complexity of the network structure will also continue to increase, which will bring a lot of calculations, greatly extend the training time of the model, resulting in the reliability of the prediction effect being decreased. The smaller the size of the convolution kernel, the less parameters and computation are needed to train the CNN. Therefore, the minimum convolution kernel size should be selected on the premise that the prediction effect can be guaranteed. Generally, a smaller convolution kernel size with a slightly larger number of convolution kernels is recommended with the support of computer performance. When the sample size is large, it can be considered to reduce the value of the batch size. However, if the sample size is blindly reduced, it is likely to be nonconvergence. Therefore, selecting an appropriate batch size value is helpful to improve the efficiency of model operation.

The settings of parameters in sentencing term and fine prediction of CNN in this paper are shown in Table 1.

4.2. Results' Analysis. In traditional regression prediction, most of the evaluation metrics consider using mean square error. Due to the particularity of sentencing and fine prediction, to make the model results more clear, we try to score the model results, and the score results can also be used for

Table 1: Parameter settings for CNN.

Parameter	Setting
Size of text	400
Embedding word vector dimension	400
Size of kernel	3
Number of kernels	512
Batch size	256
Dropout rate	0.1

Table 2: Sentencing term prediction model score.

	RF	ANN	XGBoost	CNN
Score of training set	64.5917	66.3994	67.4135	93.3621
Score of test set	58.6248	61.2346	62.3448	91.6542

Table 3: Fine prediction model score.

	RF	ANN	XGBoost	CNN
Score of training set	62.7463	65.3524	67.0012	92.4256
Score of test set	56.2615	60.7631	60.0237	90.8890

the comparison between models in the later stage. The mean absolute error after transformation considers the distance d_i between the predicted value and the true value after sample x_i processing. The larger the d_i, the larger the distance between the predicted value and the real value, and the farther the predicted value is from the real situation, the worse the prediction effect of the model. Therefore, d_i is used to construct the evaluation metric of the machine learning-assisted sentencing model, i.e., the score of the model. The model can be evaluated according to the score of the model.

$$d_i = \log(y_i' + 1) - \log(y_i + 1), \tag{1}$$

where y_i' is the predicted value of sample x_i, and y_i is the true value of sample x_i.

The model score s is defined as follows:

$$s = \sum_{i=1}^{n} s_i \begin{cases} s_i = 1, & d_i \leq 0.2, \\ s_i = 0.8, & 0.2 < d_i \leq 0.4, \\ s_i = 0.6, & 0.4 < d_i \leq 0.6, \\ s_i = 0.4, & 0.6 < d_i \leq 0.8, \\ s_i = 0.2, & 0.8 < d_i \leq 1, \\ s_i = 0, & d_i > 1. \end{cases} \tag{2}$$

4.2.1. Results for Sentencing Term Prediction. In terms of sentencing term prediction, the CNN is built to predict the sentencing term in environmental rights cases protected by international criminal law. At the same time, three traditional machine learning methods such as random forest (RF) [30], artificial neural network (ANN) [31], and eXtreme Gradient Boosting (XGBoost) models [32] also tried to predict the sentencing term. On the basis of the prediction results, the above constructed scoring system is used to evaluate and compare each method. Table 2 shows the scores of sentencing term prediction in the training set and test set under the four methods. It can be seen that in the traditional machine learning model, RF performs worse on the training set and test set compared with the other two methods, and the score is lower, while the XGBoost model has the highest score. However, regardless of whether it is RF, ANN, or XGBoost, the model scores are actually low. After using the CNN method, the model scores on the training set and test set have been significantly improved. It can be considered that compared with traditional machine learning methods, CNN is more effective in predicting the sentencing term of environmental rights cases.

4.2.2. Results for Fine Prediction. The CNN model is built with the IDB dataset for the prediction of fine, and RF, ANN,

and XGBoost models also tried, respectively. The constructed scoring system is used for evaluation and comparison, and the results are shown in Table 3. It can be seen that the fine prediction model has basically the same effect as the sentencing term prediction model in the traditional machine learning model. The CNN model also has the highest score, while the RF model has the lowest score. The CNN greatly improves the model scores for both the sentencing term prediction model and the fine prediction model, but the model scores on the fine are lower than that of the sentencing term.

In terms of feature extraction, every dimension of word vectors is trained as a feature in the traditional machine learning-assisted sentencing model. However, the CNN adopted in this paper can automatically extract feature information of the case text, which can save time and effort. Moreover, the features automatically extracted have stronger discriminant ability for later analysis. At the same time, when CNN is used to model and predict the environmental rights cases, the feature extraction and results prediction are performed in the CNN as a whole, which can maximize the performance of feature extraction and model prediction.

4.2.3. Imbalance of Sentencing in International Criminal Law. When we understand and determine the scope of sentencing circumstances, we can consider the weight of each circumstance in sentencing. The proportion of different sentencing circumstances in sentencing has not yet formed a unified provision in the international criminal court. However, according to the handling of relevant cases, we can know that the role of bad physical condition and confession in sentencing cannot be underestimated, but it is always difficult to judge the proportion of many factors in the final sentencing. In this case, in order to clearly inform the aggravation or reduction of criminal law and avoid paying too much attention to sentencing factors as much as possible, the proportion of sentencing circumstances must be determined.

It should be noted that this proportion cannot be accurately determined to a number, only for its relevant provisions and requirements. In determining the proportion of sentencing circumstances, the purpose of punishment should be considered. For international criminal law, it is necessary to always adhere to the purpose of retribution and pay necessary attention to the

special purpose of prevention. Therefore, the two purposes of sentencing should be determined in combination with the proportion of circumstances. However, it is impossible to cover all sentencing circumstances, which can only be determined at the general level. Hence, in the determination of sentencing circumstances, the following aspects should be followed: (i) The determination of circumstances of sentencing should be related to the purpose of criminal law. (ii) If it is an aggravating circumstance, because it will directly increase the penalty and cause serious damage to the rights of the defendant, it should be restricted according to the explicit provisions, and the analogy is not allowed to exist. At the same time, aggravating circumstances only include the scope of the implementation of the crime and the cause of a close relationship between the criminal act and the offender. In addition, the requirements for mitigating circumstances need not be too strict, and the scope should be appropriately expanded. As long as there is no direct connection with the criminal act, it can be regarded as the reason for mitigating the circumstances of punishment. (iii) No double evaluation is allowed. Specifically, for the same reasons of the case, the penalty should not be evaluated repeatedly, so as to effectively avoid the excessive increase or reduction of the defendant's punishment.

When determining the proportion of sentencing circumstances, on the one hand, the determination of international criminal law to punish international criminal acts should be shown, so it is not allowed to focus on the sentencing circumstances for preventive purposes. On the other hand, if the increase or decrease of the proportion of criminal law for no less than one circumstance exceeds the scope of the established proportion, specific reasons must be elaborated in detail.

For international criminal law, the criminal law itself is in the initial stage of development, and thus the problem of sentencing imbalance has not received necessary attention. That is to say, theoretical research related to sentencing imbalance is not mature, and there is no effective system to overcome it in practice. Therefore, we must attach great importance to the study of sentencing imbalance from the perspective of international criminal law.

4.2.4. International Criminal Law Protection of Environmental Rights. Given the above, we analyze the environmental rights sentencing under the protection of international criminal law assisted by machine learning. However, there are more and more provisions in international environmental crime in international treaties, and the theory and practice of using international criminal law to protect environmental rights are becoming more and more mature. Then, as a relatively independent international criminal law norm, we try to analyze what constitutive elements of international environmental crime should include.

(1) Object of international environmental crime. The object violated by principal crime is the ecological environment (resources) on which human beings depend, including environmental elements such as atmosphere, water, ocean, forest, grassland, and flora and fauna. In the case of pollution in outer space, it should be considered an international environmental crime if it violates the provisions of relevant international conventions.

(2) Subject of international environmental crime. The subjects of international environmental crime include natural persons, legal persons, and other organizations and countries, but there is a great controversy on whether a country accepts criminal responsibility for international environmental crime. We believe that with the continuous improvement of international criminal law legislation and international theory of environmental crime, incorporating the country into the subject of international environmental crime fits the needs of current international environmental protection work. Apparently, the way in which a country assumes criminal responsibility for international environmental crime is not clearly defined in the existing documents such as international criminal law. Therefore, theoretical perfection and system innovation are urgently required in future research. At present, it has gradually been accepted by the international community to include the country as the subject of international environmental crime.

(3) Objective aspects of international environmental crime. Principal crime is objectively manifested as a violation of the prohibitive provisions of international criminal law, a serious damage to human ecological environment, and a harmful act subject to international criminal responsibility. According to the different behavior modes, harmful behaviors can be divided into actions and omissions. According to the different behavioral means, harmful behaviors can be divided into those that destroy natural resources and those that pollute the environment. If there are specific classifications of harmful behaviors, they can be roughly divided into the following categories: (i) Air pollution; (ii) Marine pollution; (iii) Outer space pollution, such as the test and use of nuclear weapons and weapons of mass destruction; and (iv) Transfer of pollution.

(4) Subjective aspects of international environmental crime. The subjective aspect of international environmental crime can be intentional or negligent. Although some scholars disapprove of negligence as the subjective element of the crime, we believe it is against the efforts of the international community to strengthen environmental protection. Generally, the destruction of natural resources is mostly intentional while the pollution of the environment is mostly negligent.

5. Conclusions

International criminal law plays an irreplaceable role in the protection of environmental rights. Using international

criminal law to protect environmental rights is consistent with the current general promotion of human rights. In this paper, CNN is used to study the sentencing of environmental rights from the perspective of international criminal law, including the prediction of the sentencing term and fine. The corresponding sentencing term or fine is obtained through the description of environmental rights case text. To make the prediction effect of the sentencing term or fine more clearly displayed, the distance between the predicted sentencing term or fine and the true value is considered to construct the score; thus, the evaluation and analysis of the predicting effect of the model can be realized, and the reference basis can be provided for the selection of different assisted sentencing models. The experimental results show that the CNN-based model achieves good prediction effect on the test set. In the computer-assisted sentencing of environmental crime, besides the influence of criminal circumstances on the results of sentencing, there are other impact factors such as charges, judges, regions, etc. We should fully consider all possible factors that may affect the results of sentencing, and adopt more complex machine learning models or integrate more knowledge models to build more effective models, so that computer-assisted sentencing can be more effectively used in the actual case trial.

Data Availability

All data used to support the findings of the study are included within this paper.

Conflicts of Interest

The authors declare no conflicts of interest in this paper.

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Research Article

Innovative Mechanism of Rural Finance: Risk Assessment Methods and Impact Factors of Agricultural Loans Based on Personal Emotion and Artificial Intelligence

Na Zhao [1,2] and Fengge Yao [1]

[1]*Harbin University of Commerce, Harbin 150028, China*
[2]*Qiqihar University, Qiqihar 161006, China*

Correspondence should be addressed to Fengge Yao; yaofg2010@163.com

Agricultural finance is in an embarrassing position in the current financial environment, especially during the process of COVID-19. Based on a small-scale peasant economy, it can no longer meet the rapidly rising demand of farmers for agricultural finance. Moreover, there has been a serious disconnection between the financial system of secondary and tertiary industries, and the quality of development needs to be improved urgently. The agricultural loan risk assessment has always been the main problem that we pay great attention to in the innovation of agricultural finance. Agricultural loans are an indispensable element in supporting agricultural development and promoting rural revitalization strategy. However, financial institutions have certain credit risks in reviewing and issuing agricultural loans. This article studies the speech emotion recognition of farmers in loan review to assess loan risk. As for emotional confusion caused by speech segmentation, a special method of data connection between Convolutional Neural Networks (CNNs) and Bidirectional Long Short-Term Memory (Bi-LSTM) Networks is designed, and a variable-length speech emotion recognition model including CNN and Bi-LSTM is designed. Experimental results show that the proposed algorithm can effectively improve the risk assessment of farmers in loan review.

1. Introduction

Rural economic development is not only the purpose of rural revitalization but also the foundation and key to rural re-vitalization [1]. Rural economic development is inseparable from rural financial support. Agriculture has even become the bottleneck of China's economic development, which directly affects the coordinated development of China's social economy [2, 3]. There are not only the problems of the rural operation system itself but also the decentralization of operation mode, the transfer and reduction of the rural labor force in the process of urban-rural integration, the low comparative efficiency of agricultural products, and even the disconnection between the rural financial service system and the actual rural operation [4]. Since the reform and opening-up, China's rural financial system has been in active reform

and achieved remarkable results. However, rural financial institutions lack a real endogenous financial system based on social finance in the case of the division of urban and rural capital elements, which leads to the plight of China's rural finance.

China is in the critical period of transition from the traditional small-scale peasant economy to large-scale modern agriculture. New agricultural entities have developed rapidly, but traditional farmers still account for the majority of agricultural production and management, which will coexist for a long time [5]. Facing this situation, rural finance should not only focus on supporting the development of new agricultural operation subjects but also meet the financial needs of the development of traditional small-holders' production and operation. Moreover, both new agricultural operators and traditional smallholders are also

faced with the following problems: lack of independent property, insufficient assets that can be used for security, and lack of family and personal credit [6, 7]. How to design a rural financial system that can meet the financial needs of agricultural operating subjects and meet the fund security of rural financial institutions through innovation is still the key to the reform of the rural financial system.

China has more than 500 million rural residents: this huge population base indicates a broad rural financial market. However, even in the declining market of inclusive finance in recent years, the financial gap between agriculture, rural areas, and farmers in China is still 3 trillion yuan, and farmers' financing difficulties are still a big obstacle to rural economic development [8]. In the increasingly fierce financial market competition, small- and medium-sized rural banks (such as rural commercial banks and village banks) as a force should avoid stock competition with large state-owned banks and joint-stock commercial banks, focus on the rural financial incremental market, and provide traditional credit services for rural residents facing formal financial exclusion [9, 10]. According to the data of the third national agricultural census, the number of smallholders in China accounts for more than 98% of the main agricultural operators and 70% of the total cultivated land [11]. Farmers are still the main agricultural operators in China, and there is a general lack of effective collateral. Credit loans are the prospects for loan development. However, the weakness of agricultural operations and the instability of household income make the loan default risk higher, which is also the main cause of financial exclusion [12]. Therefore, the key to credit development of small- and medium-sized rural banks is to realize credit risk assessment of rural household loans and improve the identification ability of risk customers.

After investigation, we conclude that the risks of farmers' loans can be summarized as follows. (1) Preloan investigation risk: on the one hand, the risks are caused by the defect of farmers' own conditions; on the other hand, there is the game risk of information asymmetry between borrowers and banks. (2) Risk in farmers' loan: there are more risks in mortgage management. (3) Risk of postloan management of farmers' loans: postloan management is one of the key links to controlling loan risk. (4) Risks arising from the immaturity of the rural financial market: at present, the development of the rural financial market is not mature, mainly manifested by regional differences.

Over the past few decades, loan risk assessment has become an important basis for commercial banks to make reasonable financing decisions, reduce financing risks, and improve credit profits. Loan risk assessment methods include expert analysis, statistical analysis, and artificial intelligence (AI) [13, 14]. Studies have shown that AI has achieved better performance than statistical models in some loan risk assessment problems. Unlike statistical models, AI does not require assumptions about the distribution of variables and can derive knowledge directly from training datasets. In loan risk assessment, especially when the loan risk assessment problem is nonlinear pattern classification, the performance of AI is often better than the model based on statistical analysis. Given the above, we can conclude that

the risk of farmers' loans is affected by many factors, and how to control the risk to the minimum has become the key to a point. It is urgent to introduce AI to analyze the risk assessment methods and impact factors of agricultural loans. In addition, when the bank-end reviews the loan matters, farmers' emotions can be recognized through voice recognition so as to make a more accurate risk assessment of farmers' loans.

The main contribution of this article is that a variable-length speech emotion recognition model, including Convolutional Neural Networks (CNNs) and Bidirectional Long Short-Term Memory (Bi-LSTM) Networks, is constructed.

2. Related Works

As the risk problem of commercial banks becomes more and more prominent, many scholars begin to pay attention to the study of loan risk assessment, and the main factors affecting loan risk become the focus of research. In [15], the authors put forward an optimal decision-making model for farmer credit based on a common risk guarantee fund and its application and constructed a nonlinear optimization model based on a risk compensation fund. In [16], the author combined the fuzzy comprehensive model with the fuzzy control model to construct the model and index system of credit risk characteristics of farmers in Yanliang, Shaanxi Province. In [17], the authors studied more than 1000 production and operation data samples of new agricultural subjects in three provinces of China and constructed an XGBoost model for empirical analysis. In [18], the authors proposed a credit risk approach that minimized the relatively high loss given default of highly rated loans as a risk rating grab criterion. In [19], the authors used delinquency of agricultural loans to approximate financial pressures and used logistic regression and several machine learning methods to predict financial pressures. In [20], the authors presented a credit risk assessment model to classify the credit rating of the borrowers of "three rurals."

In this article, farmers' real-time emotions are analyzed by recognizing their speech emotions during loan reviews. Perceived emotions can be identified by changes in speech. For example, when people communicate with each other on the phone, they cannot see each other or sense their physical changes, such as blushing, while they can recognize the corresponding emotions of each other. Since emotions are related to many things, and speech is the easiest way for people to express emotions, it is of great significance to recognize the emotions of speakers through speech. In [21], the authors proposed a Focal Loss-based Convolutional Recurrent Neural Networks (FL-CRNN) deep learning model with variable input length for speech emotion recognition. In [22], the authors proposed an Automatic Encoder with Emotion Embedding (AEEE) to extract deep emotional features. In [23], Ozseven proposed a Statistical Feature Selection method based on the change of emotion on acoustic features (SFS-AF). In [24], Sun proposed an emotion recognition algorithm that did not rely on any speech acoustic features and combined the speaker's gender information. In [25], the authors proposed an emotion
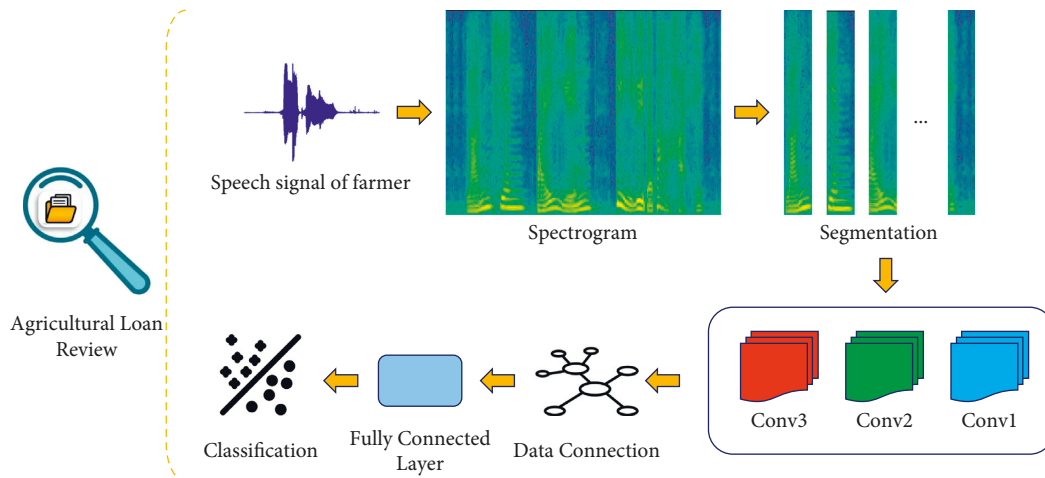
FIGURE 1: Variable-length input speech emotion recognition model.

category-based feature weight method to find the significance of each feature under different emotions and take it as a priori knowledge.

3. Proposed Methodology

3.1. Variable-Length Speech Emotion Recognition Model Based on CNN and Bi-LSTM. In this section, a speech emotion recognition model with variable-length input based on CNN and Bi-LSTM is proposed, and a connection method between CNN and Bi-LSTM is designed. This model can accept speech input of different lengths without adjusting the model structural parameters. Thus, the whole sentence speech can be input into the model, and the emotion confusion caused by segmentation can be solved by feature extraction of the whole speech directly. Therefore, agricultural loan risk can be assessed by recognizing the speech of farmers in loan reviews. Figure 1 shows the flowchart of the variable-length input emotion recognition algorithm based on CNN and LSTM.

Generally, the size of input data in neural network models is fixed, but the length of each speech sentence of farmers in agricultural loan review is basically different. Then, how to design an emotion recognition model so that it can receive variable-length input becomes a key problem. CNN is one of the most commonly used networks in deep learning classification tasks, whose characteristics of weight sharing and local connection greatly reduce the number of parameters. In the field of image recognition, CNN is usually used to process image input of the same size, and images of different sizes will be processed into the same size.

In fact, the reason why the size of CNN input needs to be fixed is that CNN usually connects the fully connected layer after using it. The input of the fully connected layer is a one-dimensional vector requiring a fixed length. CNN only performs two-dimensional convolution operations, and different input sizes will not affect the movement and convolution operation of the convolutional kernel. Output feature maps of different sizes can be obtained with different input sizes after convolution. Thus, when we design the speech emotional recognition model in agricultural loan review, feature extraction of CNN can proceed even if the input spectrogram size is different.

In the speech emotional recognition model in agricultural loan review, we introduce LSTM and design a data connection method that connects the CNN and LSTM after convolution. Bi-LSTM is adopted in this model. Compared with LSTM, Bi-LSTM overcomes the disadvantage that LSTM can only obtain updated information from the point before the current time point but cannot obtain information from the point after the current time point. Bi-LSTM can take into account both the information before the current time point and the information after the current time point. This is very important in the agricultural loan review; when farmers are asked questions about loans, there are maybe some conflicts with and in the dialogue. In the model, the dimension of Bi-LSTM's hidden layer state is set to 100, and the stack number of Bi-LSTM is two layers.

For Bi-LSTM, any output vector of Bi-LSTM contains information of all time points before this time point and information of all time points after this time point. The former is provided by the forward LSTM, and the latter is provided by the reverse LSTM. Therefore, each output vector contains relevant information on all time points. In this article, the output of the first neuron of LSTM and the output of the last neuron are combined as the output vector, which is connected to the fully connected layer to construct the global feature relationship. Finally, the classification results are output through the Softmax layer.

3.2. CNN + Bi-LSTM Connection Method. Bi-LSTM network cannot only meet the requirement of time sequence feature extraction but also meet the requirement of variable-length input. Apparently, the length of speech of farmers in loan review is not consistent. The design idea of variable-length input is similar to the coding part of the sequence to sequence process in Natural Language Processing (NLP) [26]. In NLP, different sentences will have different numbers of words, each word will be coded as a word vector, and then the word vectors of different sentences will be entered into

the LSTM unit in sequence without any input problems caused by the irregular length.

Referring to this idea, the horizontal axis of the spectrogram is the frame number, which corresponds to the speech time length, while the longitudinal axis of the spectrogram corresponds to the frequency resolution of the speech. Its size is fixed and it is fixed to 256 in the experiment.

The spectrogram outputs the multichannel three-dimensional feature map after multilayer convolution and combines the longitudinal axis and channel axis of the three-dimensional feature map into a one-dimensional vector, while the horizontal axis corresponds to a one-dimensional vector per unit. These one-dimensional vectors have the same and fixed size, meeting the requirement of fixed input vector size for subsequent LSTM units. Then we get several eigenvectors and input them into the LSTM unit in turn according to the horizontal axis of the feature map. Then we can further extract the advanced features from CNN by utilizing the time information capturing capability of LSTM.

For example, we have a 256^*200^*1 size spectrogram and a 5^*4^*4 feature map after CNN processing. Then we merge the first dimension and the third dimension to get a set of two-dimensional vectors with a size o 20^*6, and the size of each one-dimensional eigenvector is 20. We input each eigenvector into LSTM in the order of the second dimension. A total of four LSTM units are required and the output results are finally obtained.

The design of this article not only solves the problem of variable-length input but also constructs the time sequence relationship between the front and back of speech after Bi-LSTM processing. The output of the network includes the time sequence features of speech. Therefore, the results are more suitable for speech feature extraction and analysis.

4. Experiment and Results Analysis

4.1. Datasets. The experiment uses the AISHELL-1 Mandarin corpus, which is a Mandarin speech dataset with a sampling rate of 16000 Hz [27]. Among them, the training set, verification set, and test set contain 120098, 14326, and 7176 standard corpora, respectively, with a total data duration of about 178 h, and there is no overlap among the corpus of the training set, verification set, and test set. The output emotions are classified into four categories: anger, happiness, neutral, and sadness.

For the final model test, dialogues of datasets will be randomly selected in this article. In total, 80% of dialogues of the corpus are randomly selected as the training set and the remaining 20% as the test set. In this way, the identity of the speaker cannot be accurately known even in the prediction process of the final model, ensuring the universality of the final prediction model in agricultural loan review. The PyTorch framework is used for model construction in the experiment. The cross-entropy loss function is used in the model training process in the experiment, and the stochastic gradient descent method is adopted for optimization. The learning rate of training is 0.001, and the number of batch training is 8.

4.2. Parameters Setting. The overall process is shown in Figure 2. The CNN part of the model consists of three convolution layers. Farmers' speech data in agricultural loan review is sent to Bi-LSTM after being connected after CNN output. The hidden layer state dimension of Bi-LSTM is set to 50, and the stack number of Bi-LSTM is set to 2. After output from Bi-LSTM, the farmers' speech data in the agricultural loan review enter the fully connected layer to construct the global feature relationship and finally output the classification results through the Softmax layer. The specific steps are defined as follows.

The input of the model's spectrogram is the whole sentence spectrogram with a size of $1^*156^* N$, where N is the number of frames after the speech of different lengths is converted into the spectrogram.

4.2.1. CNN Part. The first layer is the convolutional layer. The step size is set to 2 and the padding is set to 0. It is composed of 64 kernels with a size of 12^*15. The maximum pooling method is used. The size of the pooling layer is 2^*2 and the step size is 2. After the convolutional pooling of the first layer, the feature map size is $64^*64^* N_1$, and N_1 is the spectrogram with a number of frames N, that is, the size of the horizontal axis of the feature map after the convolutional layer processing of the spectrogram with the horizontal axis N, and the corner marker represents the serial number of the convolutional layer. The second layer is the convolutional layer. The step size is set to 2, the padding is set to 0, and 128 kernels with a size of 15^*18 are used. The maximum pooling method is used. The size of the pooling layer is 2^*2, the step size is 2, and the padding is 0. The size of the feature map obtained after the second convolutional pooling process is $128^*12^* N_2$. The third convolutional layer only has convolution operation with 2 steps and 0 paddings, which is composed of 128 kernels with size 4^*4. The size of the feature map after convolution is $128^*4^* N_3$.

4.2.2. Data Connection Part. The final output size of CNN is $128^*4^* N_3$, and the output is $512^* N_3$ after processing of data connection.

4.2.3. Bi-LSTM Part. The obtained feature data with a size of $512^* N_3$ is regarded as N_3 one-dimensional eigenvectors with a size of 512. Each eigenvector is sequentially input into Bi-LSTM network along the N_3 dimension, and the output of the first neuron and the output of the last neuron are combined as the output vector.

4.2.4. Fully Connected Layer. The final output of Bi-LSTM is a one-dimensional vector of size 200^*1, which is input into the fully connected layer with an output size of 4^*1. Then, the value is normalized to the range of [0,1] by the Softmax function to output the classification recognition probability.

4.3. Evaluation Method. The experiment uses two general metrics and a confusion matrix to evaluate the performance of the model.
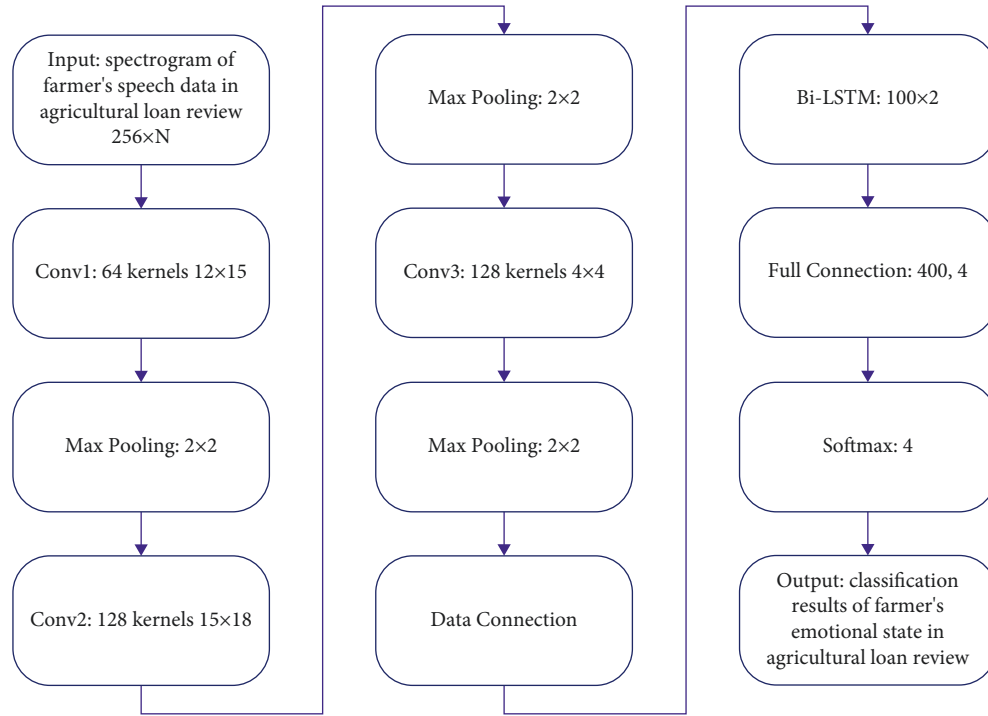
Figure 2: Flowchart of CNN + Bi-LSTM-based variable-length input speech emotion recognition.

(1) Weighted accuracy (WA), which is defined as equation (1), is the percentage of correct samples of all sentences in the test set.

(2) Unweighted accuracy (UA), which is defined as equation (2), is each type of emotional accuracy calculated separately, and then the average accuracy is obtained.

$$WA = \frac{\sum_{k-1}^{n} TP_k}{\sum_{k-1}^{n} (TP_k + FN_k)}, \qquad (1)$$

$$UA = \frac{1}{n} \sum_{k-1}^{n} \frac{TP_k}{TP_k + FN_k}, \qquad (2)$$

where n is the number of emotion categories, TP_k represents the number of correctly predicted k th samples, and FN_k represents the number of incorrectly predicted k th samples.

4.4. Spectrogram Extraction.

The spectrogram is extracted by librosa tool library in Python to extract frame-level spectral features from speech signals of farmers' agricultural loan review. Each frame is divided into 50 ms by hamming window, and there is 8 ms overlap between frames. Afterwards, a discrete Fourier transform of 1024 length is applied to each frame, and its power spectrum is obtained to obtain multiple short-time spectrums. By sorting the spectrum in chronological order, the final spectrogram is obtained. However, for the speech emotion recognition model with variable-length input, we change the processing method of the spectrogram. The purpose of our improvement is to

realize the input of the whole sentence and avoid the confusion of neutral and nonneutral emotions caused by segmentation. Therefore, the following different processing methods of the spectrogram are adopted in designing the input of the spectrogram:

(1) *No Padding.* The spectrogram of each speech is directly input into the model. However, due to the different length of each speech, the length of each spectrogram is different, so the training process of the model can only be conducted once.

(2) *Batch Padding.* To avoid the problem of low efficiency of single training, spectrograms with similar lengths are placed in the same training batch, and these spectrograms are filled to the same length by zeroing operation, with 100 frames as the unit and 100 frames as the difference, so as to facilitate the training of the model.

(3) *Maximum Length Padding.* The purpose is to compare the recognition model of fixed-length input after speech segmentation. The spectrogram of the whole sentence is filled to the maximum length of all spectrograms, which in this experiment is filled to 1300 frames.

4.5. Experimental Results and Analysis.

Experiments are performed on the fixed-length farmers' speech in agricultural loan review emotion recognition model based on CNN and the variable-length speech emotion recognition model based on CNN + Bi-LSTM, and the recognition accuracy is tested. A total of 300 cycles of training were performed in the experiment, and the model achieved the optimal recognition

effect at 164 times; then, we saved the model. WA and UA are used to represent the overall emotion recognition performance of the model. The recognition accuracy of each model structure is shown in Tables 1 and 2.

The experimental results show that the accuracy of fixed-length farmers' speech in the agricultural loan review emotion recognition model is 80.14% for WA and 76.87% for UA. The accuracy of the variable-length farmers' speech in the agricultural loan review emotion recognition model is 85.61% and 80.73% for WA and UA, respectively. Compared with the fixed-length farmers' speech in the agricultural loan review emotion recognition model, the recognition rate increases by 6.83% and 5.02%, respectively, indicating that the improvement of the input into the spectrogram of the whole sentence speech has a good effect on the improvement of recognition rate.

To make a full comparison of the effects, the old spectrogram image segments with fixed length after segmentation are used as input to the new CNN + Bi-LSTM-based model. The recognition rate increased by 4.62% compared with the old CNN-based model. This shows that Bi-LSTM improves the accuracy of the model compared with the model using only CNN. These results indicate that using LSTM to retain the sequential characteristic of speech signal can improve the effect of farmers' speech in agricultural loan review emotion recognition. In the training experiment results of the variable-length farmers' speech in the agricultural loan review emotion recognition model, the accuracy of the training set without padding input is maintained at 57.44% after 41 rounds of cycle training. At this time, WA and UA of the test set are 61.55% and 45.00%, respectively. After 118 cycles of batch padding input, the training set achieves an accuracy of 93.46%, while the test set has the best recognition accuracy, which is 85.61% for WA and 80.73% for UA. When the maximum length padding input is 152 epochs, the accuracy of the training set reaches 96.77%, and the test set has the best recognition accuracy, which is 84.99% for WA and 79.43% for UA.

As for the problem that the accuracy of the training set without padding input stays at 57.44%, we put forward two possibilities: one is that the training model may fall into local minimum due to the small step of gradient descent; second, due to insufficient model complexity, the underfitting occurs. Therefore, we test for this. Firstly, starting from solving the local minimum problem, after trying to increase the learning rate to try different values, it is found that the problem has not been improved. When the CNN model is directly replaced by the classical complex neural network ResNet-50, the problem is solved. According to the above test results, the reason for the low accuracy of the training set without padding input is the insufficient complexity of the model, and the problem of underfitting occurs. The biggest difference between batch input and maximum length input and no input is batch training. Batch training makes the model fitting effect better and overcomes the underfitting problem to some extent, achieving good results. According to the experimental results, WA input of batch padding is 0.34% lower than that of maximum length padding, and UA is 2.21% higher than that of maximum length padding. We

TABLE 1: Accuracy of fixed-length farmers' speech in agricultural loan review emotion recognition model based on CNN.

Model	WA (%)	UA (%)
Three convolutional layers	77.92	74.10
Five convolutional layers	80.14	76.87
ResNet-18 layers	78.19	71.36

analyze that the WA of batch padding input is low because the input length of each batch is different, which makes it more difficult for the model to acquire various emotional features in speech. However, the UA of the maximum length padding is low because there are too many zero-padding operations in the maximum length padding, and the existence of 0 value in the process of maximum pooling has an impact. Nevertheless, the recognition accuracy of the two models is significantly improved compared with that of the fixed-length farmers' speech in the agricultural loan review emotion recognition model.

To further achieve the purpose of this paper and analyze the improvement effect of recognition accuracy brought by variable-length input, we present the confusion matrix of the fixed-length agricultural loan review emotion recognition model based on CNN in Figure 3 and the confusion matrix of the maximum length padding variable-length agricultural loan review emotion recognition model in Figure 4. In Figure 5, the confusion matrix of batch padding input in the variable-length farmers' speech in the agricultural loan review emotion recognition model is given.

Based on the confusion matrix results, anger has the highest recognition rate in the emotion classification of fixed-length farmers' speech in the agricultural loan review emotion recognition model, while happiness and neutral emotions have lower recognition rates. This may be due to the confusion between neutral and nonneutral emotions. Not all parts of the nonneutral sentence contain nonneutral emotions. During the process of fixed-length farmers' speech in agricultural loan review emotion recognition, these neutral clips are segmented and labeled with nonneutral emotions, which makes the model unable to distinguish the characteristics between labels very well. Compared with the fixed-length model, the neutral emotion recognition rate of the variable-length model is improved, and the whole sentence is input into the network, which reduces the confusion of neutral emotions and other emotions caused by segmentation. The accuracy of happiness has also been improved, indicating that happy-related sentences contain neutral speech segments that are labeled as happiness when using input model segmentation with fixed-length farmers' speech in agricultural loan review; thus, the model cannot learn happiness characteristics well. Recognition rates for anger and sadness are reduced, possibly due to the fact that model parameters with constant input do not achieve the best results.

From the above experimental results, we can conclude that the neutral emotion confusion caused by sentence segmentation is improved after the input of fixed-length segmentation changes to that of the whole sentence. However, the model proposed in this article is not the optimal state. When the input changes to the whole sentence

TABLE 2: Accuracy of variable-length farmers' speech in agricultural loan review emotion recognition model based on CNN + Bi-LSTM.

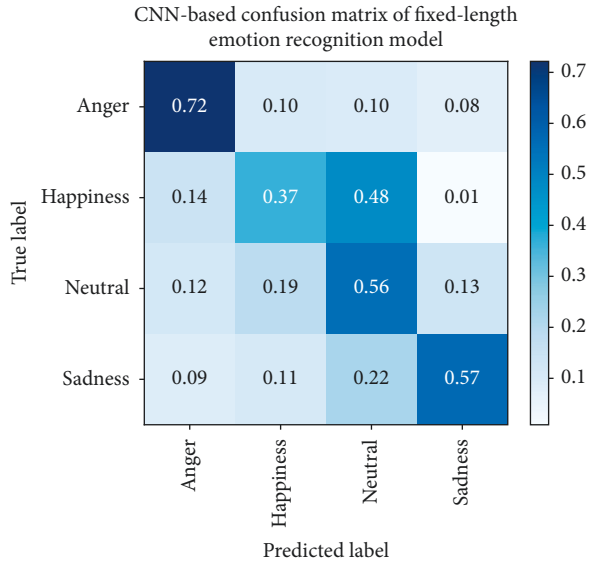| Model	Spectrogram input form	WA (%)	UA (%)
Three convolutional layers + Bi-LSTM	Fixed-length input	84.26	77.01
Three convolutional layers + Bi-LSTM	No padding input	61.55	45.00
Three convolutional layers + Bi-LSTM	Batch padding	85.61	80.73
Three convolutional layers + Bi-LSTM	Maximum length padding	84.99	79.43

FIGURE 3: CNN-based confusion matrix of fixed-length emotion recognition model.
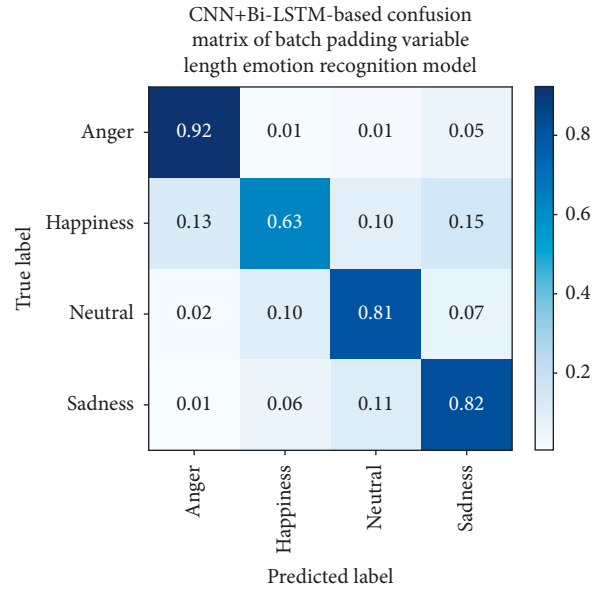
FIGURE 5: CNN + Bi-LSTM-based confusion matrix of batch padding variable-length emotion recognition model.
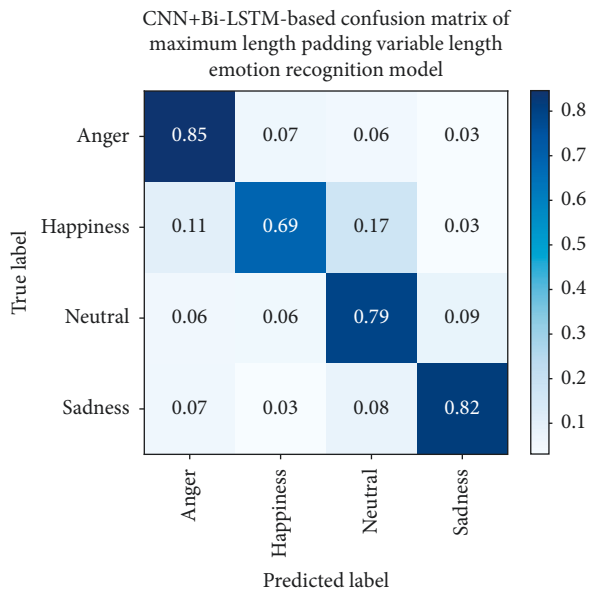
FIGURE 4: CNN + Bi-LSTM-based confusion matrix of maximum length padding variable-length emotion recognition model.

input, the number of speech emotional features increases, while some features have a low value for emotion recognition, which requires the model to be more optimized. Therefore, updating the model for variable-length input is helpful to further improve the recognition accuracy.

In addition, for the risk assessment of agricultural loans, we use speech recognition to classify the voice of farmers in loan review and then judge whether the farmers conceal the loan-related matters or not. Figures 6 and 7 are the accuracy and classification time of the CNN + Bi-LSTM algorithm and the other three baselines, respectively. As can be seen from Figure 6, the accuracy of the algorithm proposed in this article has always been the highest, all above 90%, which is very important in loan evaluation. Higher accuracy is accompanied by the accuracy of speech recognition, which is helpful for farmers' loan review. On the contrary, the performance of the three baselines is not conducive to the classification of farmers' speech recognition emotion during loan review. Figure 7 shows the comparison of classification time. The classification time of the algorithm proposed in this article has always been the lowest. In risk assessment of loan, besides the accuracy of speech emotion recognition,

FIGURE 6: Accuracy of farmers' speech emotion recognition in loan review.

FIGURE 7: Classification time of farmers' speech emotion recognition in loan review.

the classification time is also very important. Speech can well reflect the change of emotion, but the instantaneous change of tone may lead to the fluctuation of emotion, which is important for loan evaluation to be detected through speech emotion recognition.
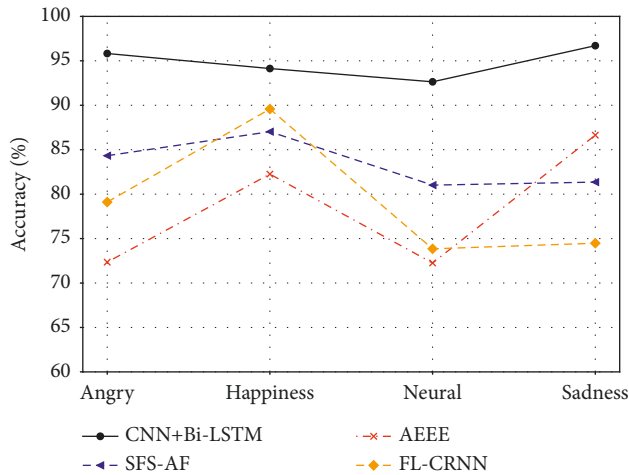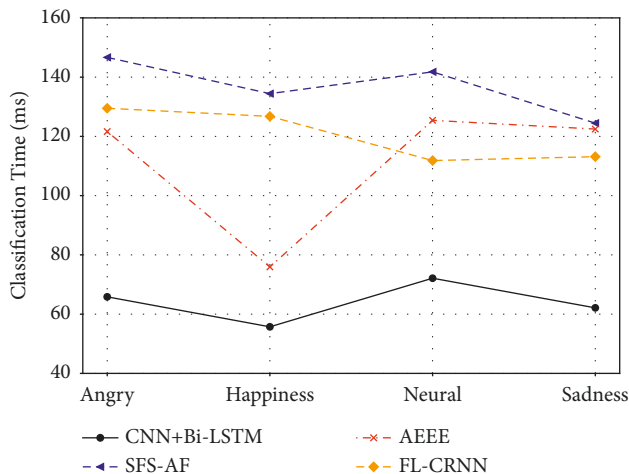
5. Conclusions

This article studies the innovative mechanism of rural finance and constructs a risk assessment model of agricultural loans based on farmers' speech in agricultural loan review emotion recognition in loan review for the confusion of neutral emotion and nonneutral emotion caused by speech segmentation of fixed-length speech emotion recognition algorithm. In this article, a variable-length input speech emotion recognition model is proposed, and a connection method between CNN and Bi-LSTM is designed. Without changing the structural parameters of the model, the whole farmers' speech in agricultural loan review of different length

can be sent into the model as input, which overcomes the problem of fixed input length of the neural network. The experimental results show that the variable-length input method can effectively solve the confusion problem of neutral emotion and three kinds of nonneutral emotion in agricultural loan review, which greatly improves the recognition accuracy of the model.

With the further deepening of the research, the following aspects can be improved in the follow-up research work: (i) this paper focuses on the research of the discrete emotional model, while the discrete emotional model simplifies the continuous state of emotion. In the follow-up work, it is necessary to increase the research on the continuous emotional description model and construct a continuous emotional change tracking curve. (ii) For the application of farmers' speech in agricultural loan review emotion recognition, the ability of speech emotion recognition to cross-database and cross-platform generalization should be improved to realize real-time detection of individual emotional changes. (iii) In the study of agricultural loan risk assessment, we should perfect and unify the farmers' credit assessment system, establish a complete database to form dynamic tracking, and improve the accuracy and applicability of loan risk assessment. (iv) The research topic of this article is the risk assessment of the farmers in loan review. The relevant speech emotion recognition model constructed in this article can be further applied to the customer loss of banks, credit card fraud recognition, and other fields to verify the applicability of the model and expand the corresponding research field.

Data Availability

All data used to support the findings of the study are included within this article.

Conflicts of Interest

The authors declare that there are no conflicts of interest in this article.

Authors' Contributions

Na Zhao contributed to writing, data analysis, and experiments; Fengge Yao contributed to methodology.

Acknowledgments

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Research Article

The Dilemma of the Great Development of Rural Tourism from the Sustainable Environment Perspective

Qin Yang [ID],[1] Jian Li,[1] and Youlin Tang[1,2]

[1]*School of Economics and Management, Shaoyang University, Shaoyang, Hunan 422000, China*
[2]*Doctor of Philosophy in Education, Adamson University, Manila 1007, Philippines*

Correspondence should be addressed to Qin Yang; 3423@hnsyu.edu.cn

Demand and motivation are powerful indicators of people's decisions and behaviors. Based on the in-depth interviews with 190 relevant stakeholders, the study found that the rural tourism industry is facing three kinds of pressures for continued growth. Under these three pressures, the rural tourism industry tends to "copy" and plunder resource-based development, which restricts the industry's sustainable growth path. Therefore, to continue the development of the rural tourism industry, we need to create a development path suitable for the sustainable development of rural tourism from three aspects: system, atmosphere construction, and market orientation.

1. Introduction

A recent study estimated that over 90% of country houses and resort hotels in China are losing money, which have to close their doors because they cannot support their daily operating expenses (https://googl.com). Rural tourism activities and rural tourism investment are increasing, but rural tourism industry is not growing [1]. Researchers and organizations call for solving the plight of rural tourism development and promoting high-quality development of rural tourism [2–4]. The term "high-quality development" refers to behavior diversification of development models, differentiation and development of product types, increased core competitiveness, improved service quality, enhanced radiation driving capabilities, etc. A recent report found that although rural tourism investors or rural tourism planners say they want to develop tourism sustainably, only a few of their specific practices are sustainable development behaviors (https://sohu.com). Researchers also found that there is a generation gap between rural tourism investors or rural tourism planners and rural destination residents regarding the values of sustainable development [5]. Although most rural tourism investors or rural tourism planners are aware of rural tourism development issues, they do not know how

to solve them and avoid them [6, 7]. How can we minimize this gap?

What factors determine the sustainable development of rural tourism? Corresponding insights are procvided from two different assumptions of human motivational behavior. Ouellette and Wood [8] suggested that human behaviors result from habits and that past behaviors can shape current and future behaviors. One hypothesis is that the relevant stakeholders of the great development of the rural tourism industry are regarded as "economic persons" pursuing utility, and the relevant stakeholders as rational economic persons participate in rural tourism according to the principle of pursuing maximum profit; another hypothesis is rural tourism relevant stakeholders of large development are regarded as "social people" who pursue the needs of different levels. It is believed that the pursuit of relevant stakeholders should be considered from Maslow's hierarchy of needs. Being in a large development environment of rural tourism not only considers material needs but also more. It is the realization of safety needs, belongingness and love needs, esteem needs, and self-actualization needs. These two assumptions also mean that, in addition to "pursuing efficiency," the stakeholders involved in the development of rural tourism

may also be constrained by a certain policy environment and fail to achieve "fair gain."

In this study, we use Demand Motivation Theory (DMT) as the basis of motivation theory analysis of microscopic subject behavior. The purpose of the study was two-fold: first, to discover the impact of interest demands of different stakeholders on the development of rural tourism; second, to test the main factors that inhibit the development of rural tourism.

The phenomenon that long-term unsatisfactory appeals for interests will lead to changes in the behavior of the actor and even escalation of conflicts among stakeholders [9, 10]. Maslow [11] divides human needs from low to high into five levels. Demand will be repeated and upgraded. Therefore, understanding the current interest levels of stakeholders is the key to solving the problem.

The existing literature gradually realizes the importance of two hypothetical theories explaining the participation of relevant stakeholders in rural tourism. For example, Jessica and Kathleen [12] believe that maintaining and enhancing the happiness of participating subjects are the key to break the obstacles in the development of rural tourism. Chin et al. [13] established an evaluation and development model to investigate the impact of rural tourism hardware services (infrastructure and accommodation) and software services (service scope and service characteristics) on the competitiveness of rural tourism destinations. Ghaderi et al. put forward the results of community capacity building (CCB) through semistructured interviews with relevant stakeholders to influence community residents' support for rural tourism. Lin and Wang [14] believe that government policy subsidies can attract investment from tourism enterprises and expand the scale of rural tourism. Ma and Luan [1] believe that the return on investment of enterprises will affect the direction of investment. Only by optimizing institutional arrangements and deepening the reform of enterprise systems, preventing excessive competition will undoubtedly increase the confidence of enterprises in investment and enhance the quality advantage of tourism economy. Wen and Yong [15] believe that the realization of the economic benefits of the community residents and the optimization of the ecological environment will affect the community residents' support for the development of rural tourism. Wang [16] pointed out that the key to realizing the great development of rural tourism is the centralized management of rural tourism resources and the best way is to realize the collective economic model.

2. Review of the Literature

2.1. A Great Development in Rural Tourism Sectors. A great development in sustainable mass tourism has become the emerging and desired outcome for most destinations [17]. A great development includes the following: (1) a general tendency to expand the scale of rural tourism; (2) high service quality and supply level of rural tourism; (3) more and more stakeholders are participating in rural tourism (e.g., [18, 19]). With the great development of rural tourism, there has been an increase in the negative impacts of tourism

on this destination; stakeholders' conflicts continue to occur [20].

Rural tourism investors or rural tourism planners have established sustainable development plans when developing rural tourism projects, but they have not done so in practice. Researchers have also found a discrepancy between stakeholders' development knowledge, their attitudes toward the great development, and their actual rural tourism. For example, local governments, developers, and residents participating in tourism development are prone to form an asymmetrical power relationship because of their different resources [21]; therefore, the rural space under tourism development must be permeated with political relations and ideology [22]. This discrepancy is partially due to interest, as made by [9, 23], who showed that most local governments and enterprises tend to obtain short-term economic benefits through the development of tourism resources, rather than long-term sustainable development strategies. Sun et al. [24] likewise claimed that rural tourism makes the production activities of traditional rural communities mainly obtain production and living materials from the natural environment (land), increasing the goal of benefiting from the tourism industry, which will lead to changes in the internal logic of rural community residents regarding production. Other factors, such as lack of innovation, comfort, culture, and local characteristics, further contributed to the gap between knowledge and attitudes towards sustainable great development (https://Sohu.com, 2019). Moreover, an increasing number of customers prefer to stay in environmentally friendly, green development type rural tourism destination, but they also admit that doing so will involve increased convenience and cost [25]. How to bridge the gap between knowledge and attitudes toward sustainable great development is currently under much-needed investigation.

2.2. Stakeholders' Behavior under the Theory of Motivation. Motivation theory believes that organizations and individuals live in a certain environment, and the driving force generated by their behavior depends on the objects in the environment. The activities and reactions under this logic of behavior are logical deductions recognized by the social environment, that is, following a reasonable demand mechanism [11]. The drive here includes "social normative, value structure, and internal drive of resource element allocation that provide a guiding and practical significance for behavioral drive" [11, 26]. Therefore, the drive contains three basic elements: social norm elements, value structure elements, and resource allocation elements. They all provide three related but distinctly different supports for organizations and individuals to participate in the development of rural tourism.

2.3. Social Normative Elements. Social normative elements include formal rules, legal systems, and informal folk customs, customs, and morals [27]. Their impact on the behavior of organizations and individuals is to impose rules on others based on the corresponding legal and moral constraints, and it can also induce people to follow the rules by

inspiring the needs that are rooted in the heart to be recognized. Therefore, following the rules is the rational basis for behavior [28].

From the research literature, it is found that social normative elements have an important role in promoting the sustainable development of rural tourism. Since 1994, the academic community has tried to study rural tourism as a special activity in sustainable tourism activities. For example, the European Union specifically proposed that rural tourism should provide policy support to rural tourism in terms of funding, policies, education, and training. The United States and Canada have advocated the sustainable development of rural tourism through methods such as propaganda and education. Font and Elgammal [29] believe that the development of rural tourism with green as the standard can not only legalize consumers' green consumption of landscapes but also dilute complex issues and regulate sustainability to reduce consumers' guilt for environmental damage, while protecting enterprises free from consumer doubt. Therefore, the following hypothesis is proposed: H1: there is a significant and positive relationship between social normative elements and their attitudes toward sustainable development of rural tourism.

2.4. Value Structure Elements. Zeithaml [25] proposed that perceived value is the overall utility of the product or service after weighing the benefit that stakeholders can perceive (benefit) and the cost (sacrifice) in obtaining the product or service. In recent years, scholars have constructed a variety of perceived value models. For example, for the consumer perceived value structure, Kantamneni and Coulson [30] proposed multidimensional product perceived value model that divides consumer perceived value into social value, experience value, functional value, and market value; Sheth et al. [31] proposed the consumer value model that divides consumer perception value into functional value, emotional value, social value, and cognitive value. Regarding the value structure of investment perception, Zeng and Huang [32] believe that the functional value, unique value, economic value, and experience value of return on investment affect the investment decision of supporters. Schwartz [33] proposed that values are beliefs that override any specific situation. This belief guides the selection and evaluation of behaviors and events and is related to the desired outcome state and behavior.

Therefore, the elements of the value structure will impose certain restrictions on the behavioral motivation of the organization and the individual, but if a certain force beyond the standard value structure is given, the behavioral motivation of the organization and the individual has an enabling effect.

Compared with conventional tourism development, rural tourism development has a completely different concept and development process on how to organize limited resources to develop rural tourism, especially how to view the sustainable development of rural tourism. Miller's [34] empirical research on the US tourism industry shows that conventional tourism believes that tourist satisfaction

and higher industry chain spillover effects can achieve the sustainable development of tourism, while the sustainable development of rural tourism not only requires tourists to be satisfied but also relatively competitive. High economic spillovers also require environmental sustainability and the improvement of local residents' living environment, especially the impact of hiring locals and local social and cultural integration. Therefore, the following hypothesis is proposed: H2: there is a significant and positive relationship between value structure elements and their attitudes toward sustainable development of rural tourism.

2.5. Elements of Resource Allocation. Mankiw [35] believed that the scarcity of resources and the infiniteness of desires cause people to face trade-offs when making decisions, that is, they are faced with the problem of having to allocate resources. As the socioeconomic development reaches a certain stage, whether it is consumers or suppliers, the resources they can control are scarce. Therefore, in most situations, people will follow the endowment effect because in the decision-making process of people's balance of interests, the consideration of "harm avoidance" is far greater than the consideration of "increasing profits."

The factors of resource allocation have a far-reaching impact on the sustainable development of rural tourism. Thaler [36] believes that people should avoid losing what they have, and it is easy to produce a "comfortable status quo" complex, and they are afraid of the loss caused by change. For example, when the government requisitions land, community residents often feel that the compensation provided by the government is too low and conflict with the government. In the development of rural tourism, in order to avoid the uncertainty caused by innovation, companies often use copying tourism products, resulting in rural. The phenomenon of tourism development is similar. Therefore, the following hypothesis is proposed: H3: there is a significant and positive relationship between resource allocation elements and their attitudes toward sustainable development of rural tourism.

3. Materials and Methods

3.1. Instruments. A quantitative research design was adopted in this study, using in-depth interviews to explore the impact of relevant stakeholders on the sustainable development of rural tourism. There are three reasons for choosing the in-depth interview method: first, how does the rural tourism industry as an emerging industry (because its development time is shorter than other industries), especially the key industries of the rural revitalization strategy, affect the "three rural" issues. We still lack in-depth understanding of the impact on participating stakeholders. The use of in-depth interviews is helpful for researchers to obtain different new explanations for unknown fields or for an apparent problem. Second, in-depth interviews are not affected by the original questionnaire framework. Through chatting, we can get a more realistic explanation of the problem, which is conducive to a deeper understanding of

the problem. Third, in-depth interviews can break through the researchers' original expectations and expected conclusions, which is conducive to the discovery of new problems and broadens the horizon of research problems.

3.2. *Sampling and Data Collection.* From October 2016 to December 2018, the sample community residents, tourists, and residents of 8 villages in three provinces including Luohe and Luoyang in Henan Province, Shaoyang and Yueyang in Hunan Province, and Shaoguan and Meizhou in Guangdong Province participated in this study. Semistructured interviews were conducted by enterprises, village collective economic organizations, and relevant government officials. The interviews were conducted as one-on-one in-depth interviews. The interviews were conducted at the rural tourist destinations where the interviewees were active. The questions interviewed focused on the attitudes, viewpoints, actions, and sustainable development of rural tourism, mainly including three categories: one is the opinions and attitudes about the development of rural tourism, such as the ecological environment, economic income, life methods, resource use, and standards for measuring sustainable development; second, actions related to rural tourism development, for example, what methods should be adopted to provide corresponding tourism products for the sustainable development of rural tourism; and third, regarding the sustainable development of rural tourism such as the problems and challenges faced by sustainable development, as well as the willingness of all stakeholders for sustainable development. The research is conducted in the form of an interview group consisting of 2-3 people. After the discussion, the interview team initially drafted the interview outline, trying to break through the fixed visit framework, and used open-ended questions to understand the subjective feelings of the sample community residents, tourists, enterprises, village collective economic organizations, and relevant government officials. Because of the large differences in the interests of the interested parties of the interview and whether the interview questions need to be kept confidential, the interview will be conducted after obtaining the consent of the interviewee. In the interview process, the differences between the interviewer's customs and language, trying to describe their own true feelings or ideas and suggestions in their own language, are taken into account. The duration of the interview is not limited by time, but at least 45 minutes. After the interview, the researcher will organize the corresponding transcripts or recordings according to the interview process into text drafts. Lincoln and Guba [37] believe that, in order to obtain the most authentic content and the most effective information of in-depth interviews, attention should be paid to the saturation of information in the number of interviews and the content of interviews. That is to say, when the information obtained is repeated and there is no new content, there should be a courtesy to end the interview.

3.3. *Data Analysis.* After in-depth interviews, in order to obtain the understanding and attitudes of different stakeholders on the sustainable development of the rural tourism industry, the researchers need to record the spoken records and emotional responses of the interviews in writing. After completing the text records, through detailed reading of each record, we invite relevant experts and researchers to identify the text records. Based on this, we can infer which written records are related to the research theme and which are not related to the research theme. Based on the technical analysis of Lincoln and Guba [37] and Glaser and Strauss [38], we strictly collect samples and analyze qualitative data acquisition that confirms the sampling, assists the subsequent data collection, clearly defines the theme, determines the comprehensive level through the review, and makes a preliminary conceptual definition based on the theme and content. After the concept is determined, the next step is to encode the concept. It is determined that the information data start to be grouped into categories, that is, open coding. The relationship between each main category and the core category forms selective coding and clarify the "story line." The data coding analysis method after the above in-depth interviews refers to that of Corley and Gioia [39], which is used to analyze the semistructured information data after the semistructured interviews, which are used to analyze the ambiguity and change of the organization's personnel identity caused by the enterprise split. This article takes a similar approach and corresponding measures to ensure the reliability of the study. First, the team of data analysts, in addition to the researchers involved in the survey, also invited peer experts to review the research process and results with a view to enhancing confidence in the reliability of the research conclusions. Second, the researchers of this in-depth interview data analysis carefully analyzed and sorted the data. Third, from the beginning of the establishment of the framework discussion to the acquisition of the final in-depth interview information and data, more researchers participated. Among them, although two researchers did not participate in the in-depth interview, the data cluster analysis is more professional, so during the spindle coding, the two researchers were asked for criticism and suggestions for data collection and analysis, so that they could analyze the collected information from an objective standpoint.

3.4. *Open Coding.* After confirming the method of data analysis above, openly code the interview data. The process of open coding is to analyze the interview data word by word, extract the important content of the interview data, and conceptualize the key content. The specific open code is shown in Table 1.

3.5. *Open Coding Principal Component Factor Analysis.* This survey divides the constraints of the development of rural tourism into 46 evaluation factors such as housing subsidies and division of property rights. The questionnaire survey combines the above index system with Likert's five-point scale method. The score of each index is 5–1 point from the options of strongly agree, agree, uncertain, disagree, and strongly disagree. High means that the approval of each

TABLE 1: Examples of open coding processes.

Interview crowd	Interview materials (partial citations)	Process Conceptualize	Category
Community residents	"Now the government encourages us to plant fields, an acre of grain directly to supplement 105 yuan, two-season rice subsidy 170 yuan. In addition to subsidies for growing rice, we have subsidies for growing wheat, corn, and other crops. Development tourism says to plant other flowers and grasses, but these are not subsidized. "Now the government is encouraging us to move to the city and live in a one-to-one payout to give us housing subsidies. It requires us to contract the fields to the enterprise for special operation. But I'm a farmer, and I only do farm work."	Production subsidies are better Unreasonable housing subsidy	Policy incentives
Tourists	"When the weather is nice, we usually use the weekend to go for a walk around the countryside and relax. If it's a long vacation, little consideration is given to rural tourism. "Roads are not easy to walk, not easy to drive (note: rural tourist destinations), we generally do not go." "It's a real country tour that evokes memories of our childhood. "Now a lot of country tourism is done the same, no taste, go once and do not want to come a second time."	Time, traffic constraints Lack of character	Travel motivation
Head of collective economic organization	"It's too difficult for farmers to organize now, and once economic interests are involved, it's hard to adjust." "The election of the head of a collective economic organization, whoever is elected, is more or less discussed." "I've tried to take the lead in dealing with these things, but I've always been doubted, and it's hard for me to do it." "The income has not been significantly increased, and it is difficult to achieve the participation of all the villagers." "Farmers earn their money through hard work. They do not want to use their money for risky investment, so the villagers to invest in shares, together to build some infrastructure problems, is difficult."	Managers are less convinced The real problem of risk and income	Trust mechanisms Structured barriers
Local government workers	"We do a lot of work on environmental governance, such as funding and sanitation worker in situ, but when it comes to the peak tourist season, there are a lot of environmental pollution problems that we cannot control, such as some tourists' habitual behavior which we cannot correct." "Before we could develop rural tourism, our villagers had to build houses with wood, which led to the cutting down of many ancient trees." "Some tourists do not pay much attention, resulting in some damage to the original ecology of plants and animals." "Some local villagers run farmhouses, some waste water discharges are not paid much attention, although many reminders, but the effect is not very good."	Environmental change requires process The destruction of the original ecology of plants and animals	Behavioral practices
Head of rural tourism enterprises	"In recent years, there have been at least 100,000 rural tourism developments throughout the country, and special towns, pastoral complexes, and special villages have blossomed everywhere. High-density rural tourism development mode is not conducive to the healthy development of rural tourism." "There has to be an influential campaign to do the publicity, or it's likely to go to dry." "New travel products are replaced quickly, and the conversion costs are high if we want to do it."	The same type of tourism products has a greater impact New types of tourism products are emerging	Competitor threats

element is higher. From the calculation results, the average score of 46 rural tourism development impact factors is between 3.066 and 4.569, the standard deviation is between 0.497 and 1.063, and the median is mainly concentrated in the two numbers, 4 and 3. In general, the average score is high, the standard deviation is not large, and the degree of dispersion of the score is more concentrated. The reason for the high average value is that with the rapid development of rural tourism, the extensive development mode with "quantity" as the development goal has gradually attracted everyone's attention and recognition. In order to further confirm whether there is a correlation between the 46 variables, this article uses the correlate command of Stata15.0 measurement software for processing and finds that there are many variables that have a very strong correlation, and some even exceed 90%, which indicates that there is a relationship between variables. With a considerable amount of information overlapping, it is very necessary for us to perform principal component analysis to integrate many initial variables into a few principal component variables that are not related to each other. From the perspective of 46 principal components, only the eigenvalues of the first three principal components are greater than 1, and the variance contribution rate of the first three principal components reaches 0.919, which basically meets our original intention of principal component analysis, but in order to further deepen and expand the principal component analysis and to study the related issues more thoroughly, we now cut into factor analysis. Factor analysis is an extension of principal component analysis. Its basic principle is to combine multiple variables with certain correlations into a few factors, so as to study how a set of measured indicators with intricate relationships is affected by a few internal factors. Independent factors dominate, so it belongs to a common statistical method for multidimensional analysis of dimensionality reduction problems. The measurement results are shown in Table 2.

From Table 2, we can see that a total of 1367 samples participated in the analysis and three retention factors were extracted. The chi-square value of the model LR test (LR test: independent vs. saturated: chi2 $(1081) = 1.7e + 04$) was $1.7e + 04$, P value (Prob > chi2) is 0.001, and the model is very significant. The variable column represents the variable name, and the three columns, Factor1, Factor2, and Factor3, respectively, describe the degree of interpretation of the first three main factors extracted (generally, the system automatically selects feature values greater than 1) for each variable. The uniqueness column represents the part of the variable that has not been extracted and explained by the first three main factors. It can be found that the loss of information is relatively small when other main factors are discarded.

To better explain and name the variables, this paper rotates the factor structure and uses the predict command to obtain the factor score. The concept of factor score is a linear situation composed of each factor by normalizing each variable to mean equal to 0 and variance equal to 1 and then weighted by factor analysis coefficients. The factor's variance contribution rate is the weighted sum of the factors, and the

comprehensive score of the factor for each sample can be obtained, as shown in Table 3. Before conducting the principal component factor analysis, standardize the constructed rural tourism industry sustainable development index variables through the measurement software Stata and use the KMO value to test whether the original variables are suitable for principal component factor analysis. The KMO value is 0.9615, ranging from 0.5 to 1.0; it is very suitable for factor analysis.

It can be seen from Table 4 that the cumulative contribution rate of the three principal component factors is 91.9% > 60%, and the principal component factor analysis can be performed completely. Three principal component factors (Factor1 (F_1), Factor2 (F_2), and Factor3 (F_3)) are selected for comprehensive evaluation. From the principal component factor analysis coefficient, it can be seen that F_1 reflects villagers' independent operation in policy incentives, distribution methods, and evaluation criteria which is difficult to achieve scale and income, villagers' enthusiasm for participating in rural tourism and villagers' shares in rural tourism, travel time and cost of tourism principles, image promotion of government information on tourism information, tourism logos of tourism motivation, the talent effect of the trust mechanism, the risk of resource integration and the comparison of income and the involvement of enterprises, and the acquisition of resources by enterprises. Different stakeholders consider different perspectives of benefits and costs, which leads to the existence of conflicts. The protection of innovation by property rights in the role and the division of property rights are too serious. 26 factors are related, mainly reflecting the sustainable development of rural tourism under the driving force of government, labor, capital, location, products, and other factors of rural tourism development. Influencing factors: F_2 reflects housing subsidies in policy incentives, pollution of structural barriers that is difficult to cure, income from evaluation standards which determines the enthusiasm of villagers to participate in rural tourism, traffic conditions and tourism costs in tourism principles, local government in tourism information timely feedback on rural tourism destination information, tourism management, whether the tourism environment is comfortable and leisure, tourism motivation, tourism trust, creativity of tourism resources, integration of rural cultural resources, resource acquisition, resource control by the village leaders, and the scale of capital restrictions in resource barriers. The conflicts of interest determine the villagers' attitudes, the location conditions in the competition conditions that are related to the development of related industries, the protection of innovative products in the role of property rights, and other 22 factors, which mainly reflect the essence of rural tourism industry development and the sustainable development of rural tourism under the constraints. Influencing factors: F_3 reflects 24 factors such as policy incentives, distribution methods, structural obstacles, evaluation criteria, tourism principles, tourism information, tourism management, tourism environment, tourism motivation, tourism trust, and trust of tourists in the main body of the relevant tourism destination, mainly embodying the influence factors of rural tourism development's customary

TABLE 2: Main categories formed by spindle coding.

Main category	Corresponding concepts and subcategories	The meaning of category
Social norms	Distribution mode Structured barriers Evaluation criteria Trust mechanism Conflicts of interest Property rights	Fair and equitable distribution is conducive to stimulate the enthusiasm of villagers to participate in rural tourism, villagers' inertial lifestyle and evaluation criteria have certain structural obstacles to the development of rural tourism, and for the trust mechanism between people, conflicts of interest and the norms of property rights system, etc. have different regular manifestations.
Value structure	Tourism principles Tourism information Tourism management Tourism environment Tourism motivation Tourism trust Tourism resources	The determination of the value of rural tourism products depends on transportation, time, cost, information, management, trust, tourism resources, and motivation to initiate tourism activities, and they together constitute the brand value structure of rural tourism.
Resource allocation	Policy incentives Resource integration Resource access Resource barriers Competitive conditions	Encouraging the development of rural tourism is conducive to the rapid development of rural tourism, but the integration of rural tourism resources, difficult access and resource utilization obstacles, tourism products, location disadvantage, and related industries supporting the development of rural tourism are the bottleneck of sustainable development of rural tourism.

TABLE 3: Principal component factor analysis of sustainable development of rural tourism industry.

Principal component factor	Variance	Variance contribution rate	Total
Factor1 (F_1)	15.308	0.326	0.326
Factor2 (F_2)	14.393	0.306	0.632
Factor3 (F_3)	13.493	0.287	0.919

TABLE 4: Basic situation of variable factor analysis of sustainable development of rural tourism industry.

Variable	Factor1	Factor2	Factor3	Uniqueness
A1	0.931	0.113	−0.083	0.113
A2	0.950	−0.187	0.024	0.062
A3	0.881	0.343	−0.077	0.101
A4	0.927	−0.170	−0.188	0.077
A5	0.861	0.126	0.364	0.110
A6	0.944	0.223	−0.009	0.060
A7	0.939	0.083	−0.202	0.071
A8	0.919	0.310	0.025	0.059
A9	0.927	−0.286	0.062	0.055
A10	0.907	0.220	0.049	0.126
A11	0.944	0.123	−0.115	0.081
A12	0.915	−0.142	0.281	0.064
A13	0.942	0.229	−0.014	0.059
A14	0.951	−0.135	−0.059	0.075
A15	0.950	−0.035	−0.205	0.055
A16	0.933	−0.262	0.112	0.048
A17	0.920	−0.191	0.185	0.084
A18	0.936	−0.204	0.169	0.055
A19	0.778	0.466	0.226	0.127
A20	0.884	0.166	0.237	0.135
A21	0.876	0.199	0.297	0.105
A22	0.930	−0.129	0.240	0.061
A23	0.947	−0.076	−0.026	0.096
A24	0.925	−0.160	0.241	0.061
A25	0.897	−0.058	0.319	0.091

TABLE 4: Continued.

Variable	Factor1	Factor2	Factor3	Uniqueness
A26	0.916	−0.209	0.255	0.053
A27	0.946	0.109	−0.128	0.077
A28	0.933	0.194	0.020	0.092
A29	0.936	0.132	−0.103	0.096
A30	0.928	−0.262	−0.076	0.065
A31	0.896	0.390	0.032	0.044
A32	0.913	0.149	−0.242	0.086
A33	0.936	0.173	0.101	0.084
A34	0.938	−0.002	−0.247	0.059
A35	0.946	0.040	−0.198	0.065
A36	0.943	−0.072	−0.214	0.060
A37	0.945	−0.154	−0.120	0.070
A38	0.936	0.113	0.039	0.110
A39	0.923	−0.157	−0.184	0.090
A40	0.945	0.042	−0.144	0.085
A41	0.920	−0.234	−0.104	0.089
A42	0.950	0.157	−0.090	0.064
A43	0.913	−0.301	0.033	0.076
A44	0.893	−0.235	0.109	0.135
A45	0.917	−0.233	−0.085	0.098
A46	0.922	−0.023	−0.167	0.121

thinking of various stakeholders on the sustainable development of rural tourism. From this, the weight coefficients of each index are further obtained, and the formula for calculating the comprehensive evaluation index of the sustainable development index of rural tourism is constructed:

$$F = 0.326F_1 + 0.306F_2 + 0.287F_3. \quad (1)$$

In the comprehensive evaluation model of principal component factors, the variance contribution rate of F_1 reached 32.57%, indicating that the internal driving force of factors such as the role of government, labor, capital, location, and products in the development of rural tourism is

strongly related to F, and it reflects 26 types. Among the factors, villagers have a fair distribution method, it is more difficult for villagers to operate independently, it is more difficult for the government to promote rural tourism destinations, it is more difficult for enterprises to obtain tourism resources and stimulate village democratic participation, and there are lower profit margins and scarcity of tourism service talents. The protection coefficient of the product is the highest. It can support enterprises through government policies, the government and enterprises encourage villagers to actively participate, and the local government promotes more; the variance contribution rate of F_2 reaches 30.62%, indicating that rural tourism development is affected by factors of tourism resources (such as housing and land restrictions) and the nature of rural tourism development (such as the comfort, safety, and trust brought by the combination of nature and culture), which is highly relevant to F. Among the 22 factors reflected in it, pollution of rural tourism destinations, villagers' income, whether the government provides regulated services and constraints on tourists, the improvement of infrastructure, the creation of a safe atmosphere, the innovation of tourism products, and the location condition coefficient are the highest, meaning that rural tourism development is subject to transportation constraints and tourism products. Development and income from participating in village tourism development with villagers are mainly through improving infrastructure, designing rural tourism products according to consumer needs, increasing government assistance to rural tourism services, and improving villagers' income. The F_3 variance contribution rate is 28.71%, indicating that rural tourism development is subject to government policies and evaluation criteria for villagers' participation in rural tourism development and whether tourists' travel is strongly related to F. Among the 24 factors reflected in it, a large number of zombies exist: pollution in rural tourist sites is difficult to control, villagers have a higher proportion of migrant workers, the control of villagers' free time to join rural tourism and the improvement of the environment, the amount of time spent traveling, the evaluation of the tourist environment and other tourists, and the behavior of the person in charge of the village collective organization. The involvement of enterprises and whether the village collective organization has the highest coefficient of control over resources mean that the development of rural tourism is subject to the vitality of rural tourism development, the participation of villagers, the reputation of the tourist destination, and the head of the village collective organization and the enterprise.

In the mean analysis, the rural tourism environment, the motivating factors of tourism, the creation of a safe atmosphere in rural tourism destinations, the attitudes of villagers, the supervision of rural tourism management and restrictions on tourists, the innovation and protection of tourism products, the government's publicity of tourist destinations, the location conditions of competition conditions, the development of other industries, and the convenience of transportation are all scored above 4 points, indicating that experts, tourists, villagers, entrepreneurs, village collective economic leaders, etc. participating in the questionnaire recognize these factors higher, which have a greater impact on the sustainable development of rural tourism. In the principal component factor analysis, the variance contribution rate of F_1 is higher, indicating that among the factors affecting the sustainable development of rural tourism, the villagers tend to demand the villagers' fair distribution method and the villagers' independent operation. It is more difficult to introduce other social capital, strengthen the government's promotion of rural tourism destinations, village collective economic organizations to assist enterprises to obtain tourism resources and stimulate village democratic participation, increase profit margins, introduce tourism service talents, and increase rural tourism innovation products.

3.6. Spindle Coding. From the index design to the extraction of principal component analysis factors, the analysis idea is to extract the components by summarizing the conceptualized content and its relevance and the correlation between different conceptualized content to form a generalized main axis factor, which is the main axis coding. Combine the conceptualization formed by the open coding in Table 2, realize the categorization of conceptualized information according to the principal component factor analysis, and summarize the information logical relationship of categorized coding to extract three main categories, namely, social norms, value structure, and resource allocation. The main categories and their corresponding open codes are shown in Table 4.

After the formation of the main category to the final selective coding stage, its role is to clarify the relationship between the main category and the core category, to reach the theoretical saturation and form a conceptual model, in-depth interviews, index selection, and main component factors. Based on the combination of extraction (that is, the combination of open coding and spindle coding), a structural model of factors affecting the sustainable development of rural tourism is constructed, as shown in Figure 1.

3.7. Research Findings. Data analysis after in-depth interviews found that the sustainable development of rural tourism faces three major pressures: social norms, value structure, and resource allocation. In the absence of an effective coordination mechanism under the three major pressures, rural tourism development seems to be more inclined to "short and fast" and "conventional" production methods, thus restricting the growth of rural tourism.

3.8. Social Normative Pressure. The interview data show that the sustainable development of the rural tourism industry is constrained by social normative pressure. First of all, the current production and lifestyle of the villagers still dominate the modern rural production and lifestyle. The villagers are always engaged as foreign workers or independently operating small-scale farmhouses. Fei [40] stated that China's rural areas are typical rural villages, with little
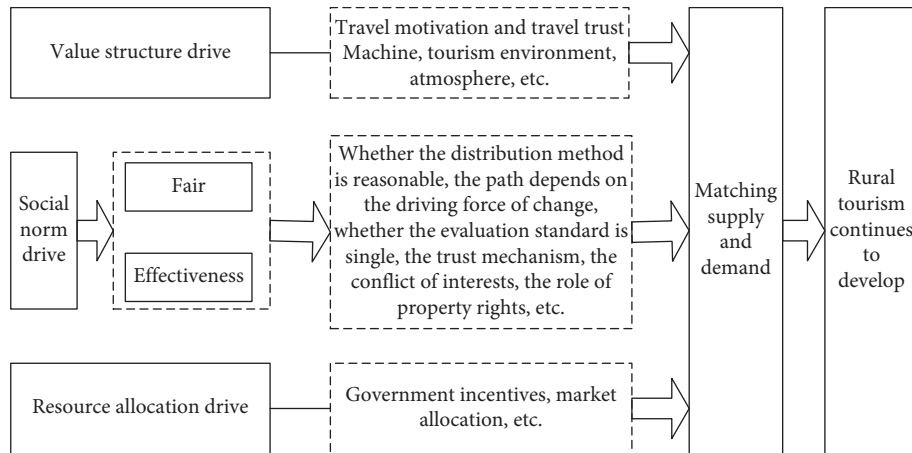
FIGURE 1: The analysis of the obstacles to the growth of rural tourism.

change, stable culture, and few new problems. They do not want their lifestyle and rhythm to be disrupted. Second, villagers are faced with conflicts of interest with various stakeholders. Whether the interest acquisition of the transfer of resources and the value of the benefits match the value of the resources is directly related to a series of factors such as the trust mechanism, distribution methods, and evaluation standards. They think more about short-term profits. Third, how to deal with the issues of ethics and legal norms, the lack of protection of property rights, the mutual duplication of tourism products, and the severe division of property rights has caused the resources to be more scattered, which has restricted the development of rural tourism to varying degrees. In short, in the existing rural tourism, villagers and other stakeholders have tended to obtain economic income faster in the existing market system, which has imposed social normative pressure on long-term tourism development planning. Under such pressure, villagers and other stakeholders are more likely to choose extensive rural tourism development methods in order to obtain more stable income support.

3.9. Value Structural Pressure. The interview data show that the development of rural tourism is also constrained by structural pressure on value. This structural pressure on value is mainly reflected in the following three aspects: first, the tourism value contained in the tourism resources held by the villagers. First, the villagers are not clear about the impact of their value on rural tourism and their attitudes on rural tourism: just as a farmer said, "Labor has also become part of the development of rural tourism? This is not understood." Second, the villagers believe that the satisfaction of rural tourists is not determined by him and has little to do with him. Second, the evaluation criteria of tourists on the value of tourism products: the evaluation of tourists on tourist destinations is a combination of multiple factors, and the combination of multiple factors is difficult to satisfy all. As a result, tourism development products are copied more seriously, such as environmental construction and copy of management system. Third, the amount of tourists and income are used to measure the quality of rural tourism development. For example, some regions use ticket income to

obtain a large amount of short-term benefits. These development methods, which are consistent with conventional and conservative values, comparative evaluation standards, and production standards in accordance with "manufacturing," have become the shared concepts and ways of thinking of rural tourism development. Also, this kind of thinking is unconsciously accepted by the majority of stakeholders, which restricts the continuation of the life cycle of the rural tourism industry.

3.10. Resource Allocation Pressure. In addition to social normative pressure and value structural pressure, the development of rural tourism is also facing resource allocation pressure. First of all, in rural economic development, it is widely recognized that agriculture is the main production method. For food subsidies, even the barren land for many years has recently been reclaimed and planted, and it is more difficult to levy construction land just needed for tourism. Second, the implementation of the rural revitalization strategy, the introduction of a large number of rural tourism projects, the suitability of the local ecology, the richness of the tourism culture, and the competitive advantage are all lacking in consideration. Third, the obstacles to resource integration, resource acquisition, and resource development have, to a certain extent, led to the formation of dead projects and the waste of resources. Moreover, the widespread existence of such resource allocation pressure has broken or induced rural tourism development to lack the depth and length of development, thus restricting the long-term strategic development of rural tourism.

4. Conclusions, Limitations, and Future Research

The main purpose of this article is to explore the constraints and countermeasures for the practical problems facing the sustainable operation of rural tourism under the great development of rural tourism. Through in-depth interviews with 190 rural tourism stakeholders in the three provinces of Henan, Hunan, and Guangdong, the study found that the development of rural tourism continues to

be constrained by three kinds of pressures: (1) social normative pressures, including those that are conducive to conventional agriculture, contradictions such as policy incentives for the development of a household-to-household, lack of power and responsibility mechanisms applicable to the sustainable development of rural tourism, and conflicts of interest among the main bodies of the sustainable development of rural tourism; (2) value structure pressure, including differences in the evaluation of the value of tourism resources, the destruction of the integrity mechanism, the complexity of the management system, and the formation of criteria for evaluating the development of tourism destinations based on price and revenue; (3) pressure on resource allocation, including policy-oriented investment practices, relying on government "blood transfusion" assistance, and consumer demand for tourism diversification and specialization. In addition, under the three pressures, the various interest subjects are able to achieve the desired utility for their own needs, and they are more inclined to obtain instant benefits, which hinders the continuous development of the rural tourism industry. This study has several limitations. The measurements of the limitations of rural tourism destinations are investigated. China is a multiethnic country, and a small sample might create a social desirability bias [41, 42]. The online survey response rate was relatively low; thus, there was a nonresponse bias. Individuals who may have different opinions were unable or unwilling to participate.

Future research will confirm the impact of stakeholder demand-driven issues on rural tourism destinations. There may be many variables in the demand drivers of stakeholders. The study of these variables is helpful to the sustainable development of rural tourism destinations. Qualitative research may reveal the attitude of stakeholders towards rural tourism destinations and their feelings about development. Future research can control different driving factors to further promote research. Other intermediary factors can also be considered, such as emotional energy factors, to regulate the sustainable development behavior of stakeholders.

Data Availability

The data are available on request.

Ethical Approval

Appropriate approvals were obtained.

Conflicts of Interest

There are no conflicts of interest in this paper.

Authors' Contributions

Qin Yang was involved in writing and supervision. Jian Li was involved in analysis. Youlin Tang was involved in data analysis.

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