

Retraction

Retracted: The Development of “Internet +” Smart Environmental Protection Multi-Environment Perception System

Security and Communication Networks

Received 12 January 2023; Accepted 12 January 2023; Published 22 January 2023

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Security and Communication Networks has retracted the article titled “The Development of “Internet +” Smart Environmental Protection Multi-Environment Perception System” [1] due to concerns that the peer review process has been compromised.

Following an investigation conducted by the Hindawi Research Integrity team [2], significant concerns were identified with the peer reviewers assigned to this article; the investigation has concluded that the peer review process was compromised. We therefore can no longer trust the peer review process, and the article is being retracted with the agreement of the Chief Editor.

The author does not agree to the retraction.

References

- [1] Z. Xu, “The Development of “Internet +” Smart Environmental Protection Multi-Environment Perception System,” *Security and Communication Networks*, vol. 2022, Article ID 3680829, 12 pages, 2022.
- [2] L. Ferguson, “Advancing Research Integrity Collaboratively and with Vigour,” 2022, <https://www.hindawi.com/post/advancing-research-integrity-collaboratively-and-vigour/>.

Research Article

The Development of “Internet +” Smart Environmental Protection Multi-Environment Perception System

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Received 22 January 2022; Revised 19 April 2022; Accepted 30 April 2022; Published 27 May 2022

Academic Editor: Muhammad Arif

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With the development of the economy and people's longing for a better living environment, the smart and environmentally friendly ecological environment has entered a period of intensive research. However, the current ecological environment resources cannot be used reasonably, and word of mouth and tourism economy are showing negative growth. In order to be able to conduct an in-depth study of the ecological environment, based on “Internet +” and perceived value, this paper builds a comprehensive evaluation model of a smart and environmentally friendly ecological environment based on a multiple perception system. This article establishes an evaluation index system that combines two systems of multiple perception systems and ecological environment, six secondary indicators, and 22 three-level indicators. In this paper, the comprehensive evaluation value of the smart environmental protection ecological environment is 0.78595, and the level of the multi-perception system is good. At the same time, the corresponding evaluation values of visual perception, functional service perception, and cultural and activity perception are 0.75431, 0.70196, and 0.78846, respectively. The comprehensive evaluation value of the ecological environment is 0.65734, and the level of ecological environment development is average. The corresponding evaluation values of the subsystem environmental quality level, environmental pressure level, and environmental improvement level are 0.69943, 0.63491, and 0.60279, respectively. The coordination value of the multi-perception system and the ecological environment is 0.9978, which is an ultra-high-level coordination stage. The comprehensive evaluation value of the two is 0.8659. At this stage, the degree of interaction between the two is strong and affects their development.

1. Introduction

The “Internet +” smart environmental protection proposed by the state in 2015 provided ideas for our ecological environmental protection work. In addition to regulating and restricting the ecological environment through sound laws, regulations, and systems, the academic community has proposed many ways to achieve a smart and environmentally friendly ecological environment and sustainable development through theoretical construction and practical application. One of them is scientific planning. Carry out careful planning and design, scientific analysis, and demonstration of the characteristics, development direction, and theme of the ecological environment, and then propose a practical and smart environmental protection strategy. The environmental protection multi-environment perception

system based on the Internet + can very effectively adjust the ecological environment and improve the index of the ecological environment.

Many research teams at home and abroad have conducted in-depth research on environmental protection and smart environmental protection. In [1], the author captures the social ecosystem using key variables and interactions in the Ostrom Social Ecosystem Framework, which integrates the broader ecosystem processes, management variables, resource usage behavior, and resource units being managed. His research on environmental protection and intelligent environmental protection is very in-depth, but his coverage on the Internet + is not complete. In [2], the authors assessed the damage to livelihoods caused by tropical storms in three coastal areas during 2008–2013. Stakeholder participation and the integration of climate change adaptation into overall

socioeconomic development planning and local land use planning are also important. In [3], based on the systematic survey data of 2010 and 2016, the author conducted a diachronic study on the ecological perception changes of immigrants and their main driving factors at different times. In [4], the authors measured how habitat change affects perceived risk in small mammals, enabling them to assess how perceived risk affects important behaviors and reflects actual risk. In [5], the authors used the Heckman sample selection model to analyze the two-step process of adapting to climate change, which initially required farmers to recognize that climate was changing before adapting to climate change. In [6], the author proposed and adopted a structural model to test the impact of environmental literacy, environmental awareness, environmental attitude, and environmental behavior when middle school students purchase environmentally friendly products. In [7], the author analyzed the collected data using a crosstab between questions about solid waste management and environmental awareness levels. Due to higher awareness of environmental issues and better solid waste management practices, higher education institutions can cultivate a better adaptive workforce in sustainable development [8]. In [9], the authors use convenient sampling techniques and quantitatively manage and interpret the data by using frequency measurements. This study found that the SECI model performed the highest in *S*, *E*, *C*, and *I*, with 77%, a median of 18%, and a minimum score of 6%. There is a significant difference in students' environmental awareness in the level of green education knowledge, and there is a significant difference between parents' guidance intensity on the environment and students' environmental awareness [10]. In [11], the author explored the relationship between personality traits and pro-environmental behavior. Studies have found that honesty, friendliness, openness, proactive personality, and pro-environmental attitudes can predict environmental behavior. In [12], the author tried to fill the gaps in the existing literature by conceptualizing environmental performance awareness (EPA) construction. The results of the qualitative analysis proposed a three-dimensional structure that includes human health, ecosystem vitality, and socioeconomic sustainability [13]. To sum up, most of the literature is about ecological environment and environmental protection, and the application on the Internet is not deep enough.

Through the analysis of research status at home and abroad, we know that in response to national policies, all parts of the country are working hard to build and protect their own ecological environment. However, everyone is also facing many ecological and environmental problems, such as insufficient forest coverage, severe rocky desertification, low industrial water repetition rate, water and soil loss, and geological disasters. These problems are not concentrated in one block but are scattered in different regions, which is more difficult to handle.

Over the past 35 years, China's amazing economic growth has paid a price, especially the severe deterioration of its natural environment. The Chinese authorities have adopted a series of measures to address this challenge, including implementing specific targeted environmental

protection measures for commercial enterprises [14]. The overall goal of environmental protection is to basically control environmental pollution, improve the environmental quality of major cities, and coordinate environmental, economic, and social development [15]. In [16], the author analyzed nearest-neighbor statistics, spatial correlation measurement models, and spatial measurement models to analyze the differentiation characteristics of forests; protect and construct from the perspective of ecology from both the forest and water bodies, and establish the ecological protection model with the least cumulative resistance model. In [17], the authors used biosphere compatibility indicators to evaluate the effectiveness of environmental protection methods. The biosphere compatibility indicator is a mathematical expression of tripartite balance, which enables us to quantify the effectiveness of different environmental protection methods to choose the environment that is most suitable for these conditions. In [18], the author compared the relationship between safety assessment and step-by-step testing methods by carefully studying the feasibility of the area of concern (LoC) in important aspects of environmental risk assessment. The author discusses its usefulness in assessing long-term effects, impacts on nontarget organisms, and protecting species. In [19], the author obtained the spatial distribution map of plants and soil types based on TM remote sensing images and soil texture data, and then used the corresponding mathematical model to evaluate the ecological water demand of the plant-soil system [20]. In [21], the author uses the theory of landscape security pattern and the minimum cumulative resistance model to build a comprehensive landscape security pattern. In [22], the author makes quantitative analysis on the implementation of several water diversion projects in the lower reaches of the Han River, such as hydrology, water environment, and ecological cumulative effect degree of aquatic wetland, and puts forward suggestions for ecological environment protection of the Han River [23]. In [24, 25], the author conducted a face-to-face interview with 125 farmers around Yancheng Rare Bird Nature Reserve on the basis of a survey of the tidal flat ecological environment in Yancheng. The research results provide a scientific reference for the ecological services of protected areas. In [26], the author established a hierarchical index model of comprehensive evaluation of ecological carrying capacity based on "resource and environmental carrying capacity, ecological resilience, and socioeconomic coordination." This method provides new feasible ideas and effective measures for smart environmental protection ecological environment [27, 28].

In order to be able to conduct an in-depth study of the ecological environment, based on "Internet +" and perceived value, this paper builds a comprehensive evaluation model of a smart and environmentally friendly ecological environment based on a multiple perception system [29, 30]. This article establishes an evaluation index system that combines two systems of multiple perception systems and ecological environment, six secondary indicators, and 22 three-level indicators. In this paper, the comprehensive evaluation value of smart environmental protection ecological environment

is 0.78595, and the corresponding evaluation values of visual perception, functional service perception, and cultural and activity perception are 0.75431, 0.70196, and 0.78846, respectively; the corresponding evaluation values of environmental quality level, environmental pressure level, and environmental improvement level are 0.69943, 0.63491, and 0.60279, respectively. The coordination value of the multi-perception system and the ecological environment is 0.9978, which is an ultra-high-level coordination stage. At this stage, the interaction between the two is strong and affects their development. At the same time, the comprehensive evaluation value of the two is 0.8659, and the perception experience and the ecological environment are in a good coordination level, which influence and promote each other [31, 32].

2. Method

2.1. "Internet +" Ecological Environment-Related Theoretical Concepts

2.1.1. "Internet +". The essential difference between "Internet +" and the Internet lies in "+." As an important invention of development across the ages, the Internet has made the world a global village and achieved zero distance between people. However, from the traditional industrial era to the Internet era, what has changed is only the use of the Internet as a tool for traditional enterprises, reflecting the "tool concept" of technology. "Internet +" presents a new system and new structure, not just a simple addition, but a new form that breaks the internal structure and thinking mode. The essence of "Internet +" is fragmentation and reconstruction, which reflects the "ecological view" of technology.

2.1.2. *Landscape Ecology Theory*. Landscape ecology is a new branch of ecology that studies the spatial structure, interaction, coordination functions, and dynamic changes of the whole (i.e., landscape) composed of many different ecosystems in a relatively large area. Landscape ecology is mainly derived from landscape theory of geography and ecological theory of biology. The method of landscape ecology evaluates the status of ecological environment through the analysis of landscape spatial structure, function, and stability. Landscape ecology methods are widely used in ecological environment quality status assessment and impact assessment; urban and regional land use planning and functional zoning; construction project ecological environment impact assessment; and landscape ecological resource assessment.

2.1.3. *Nature Conservation Theory*. With the development of society, human beings have been increasing their efforts to exploit and utilize natural resources. Irrational development has caused a great degree of damage to the natural environment and ecological balance, and limited natural resources will gradually dry up, which has challenged the long-term survival and development of mankind. Therefore, while

mankind develops and uses natural resources, it is necessary to reasonably protect nature and maintain the normal operation of the ecological balance. Biodiversity refers to a stable ecological complex composed of a variety of living animals, plants, microorganisms, and other organisms in a certain area. There are different understandings of the objects of nature conservation. Some people think that nature protection is "maintaining various conditions that human beings can exert their maximum potential"; some people think the protection of animals and plants that constitute nature and the geological objects that need to be protected, and efforts to transform the unfavorable environment caused by human activities into a favorable environment for human beings.

2.2. Smart Environmental Protection Ecological Environment Quality Evaluation Model

2.2.1. *Calculation Method of Biodiversity Index (BI)*. The biodiversity index (BI) is a weighted summation of 6 evaluation indicators of plant species richness, animal species richness, diversity of ecosystem types, completeness of the vertical layer spectrum of vegetation, species specificity, and alien species invasion. Ecosystem diversity refers to the variation and frequency of different ecosystems. It refers to the diversity of habitats, biological communities, and ecological processes in the biosphere, as well as the diversity of habitat differences and ecological changes in the ecosystem.

$$S_w = \frac{(S_1 \times A_1 + S_2 \times A_2)}{2} \quad (1)$$

In the above formula, S_w is the normalized species richness; S_1 is the number of wild higher animal species; A_1 is the normalized coefficient of wild higher animals; S_2 is the number of wild higher plant species; and A_2 is the normalized coefficient of wild higher plants.

$$S_T = \frac{(S_3 \times A_3 + S_4 \times A_4)}{2} \quad (2)$$

In the above formula, S_T is the normalized species peculiarity; S_3 is the number of endemic wild higher animal species; A_3 is the normalization coefficient of endemic wild higher animal; S_4 is the endemic wild higher plant species; and A_4 is the normalization coefficient of endemic wild higher plants.

2.2.2. Environmental Quality Evaluation Model

(1) *Single Factor Environmental Index*. The simplest environmental quality index is a single factor environmental quality index. The single factor environmental quality index is defined as

$$I_i = \frac{C_i}{S_i} \quad (3)$$

where C_i is the concentration of the i -th pollutant in the environment and S_i is the evaluation standard of the i -th

pollutant in the environment. The environmental quality index is a dimensionless number, which indicates the extent to which the actual concentration of pollutants in the environment exceeds the evaluation standard, that is, a multiple that exceeds the standard. The larger the value of Ii, the worse the environmental quality of the single item.

(2) *Mean Multi-Factor Index*. The calculation formula of the average multi-factor environmental quality index is

$$I = \frac{1}{n} \sum_{i=1}^n I_i = \frac{1}{n} \sum_{i=1}^n \frac{C_i}{S_i}. \quad (4)$$

In the formula, n is the number of factors involved in the evaluation, and the rest of the symbols have the same meaning as the single factor environmental quality index. The basic starting point of the mean-type multi-factor environmental quality index is that the effects of various environmental factors on the environment are equivalent.

2.3. *Multi-Perception System Based on Ecological Environment*. Using matrices instead of traditional qualitative descriptions can more scientifically and accurately explain various variables and their relationships; that is, environmental responsibility behavior variables of different motivations and different destinations can be solved by this model. The principle of environmental responsibility refers to the environmental legal obligations that various entities should perform in the process of development, utilization, protection, and management of environmental resources and the adverse legal consequences that should be borne by the violation of obligations. The mathematical expression of the environmental responsibility behavior decision measurement model is as follows:

$$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \cdots + \beta_k X_{ki} + u_i, \quad i = 1, 2, 3, \dots, n. \quad (5)$$

Decision anchors have adaptive characteristics such as relative stability, predictability, cognition, feasibility, and timeliness. In the above expression, β_1 = intercept, the value of which corresponds to the “decision anchor” of environmental responsibility behavior; $\beta_2 \rightarrow \beta_k$ = slope coefficient, which represents the weight coefficient of each variable that affects environmental responsibility behavior decision; u is a random interference variable, the number of random variables that affect environmentally responsible behavior decisions; and n represents the total number of all environmentally responsible behavioral decision variables. The formula is an abbreviated expression of n simultaneous equations:

$$\begin{bmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_n \end{bmatrix} = \begin{bmatrix} 1 & X_{21} & X_{31} & \cdots & X_{k1} \\ 1 & X_{22} & X_{32} & \cdots & X_{k2} \\ & & \vdots & & \\ 1 & X_{2n} & X_{3n} & \cdots & X_{kn} \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_n \end{bmatrix} + \begin{bmatrix} u_1 \\ u_2 \\ \vdots \\ u_n \end{bmatrix}. \quad (6)$$

The above formula can be converted into: $Y = X\beta + U$.

The above expression is the measurement model of environmental responsibility behavior decision. Y represents

n observation vectors, b represents k unknown parameters, U represents n interference terms, and X represents an $n * k$ observation vector matrix. Among them, X basically covers various influencing factors and variables in the traditional behavioral decision-making model, and the above variables are divided into two categories: motivation and destination.

Econometric models use cross-sectional data as sample data for econometric models. Based on the econometric model derived from the above formula, this paper analyzes the process of environmental responsibility behavior decision-making through path analysis, thereby constructing a structural equation model for the path analysis of environmental responsibility behavior decision-making.

$$\begin{cases} X_2 = P_{21}X_1 + P_{2a}e_a, \\ X_3 = P_{31}X_1 + P_b e_b, \\ X_4 = P_{41}X_1 + P_{42}X_2 + P_{43}X_3 + P_{4c}e_c. \end{cases} \quad (7)$$

Among them, X_1 is the influencing factor variable of destination choice, X_2 is the environmental awareness and environmental attitude variable, X_3 is the motivation variable, X_4 is the environmental responsibility behavior decision variable, and P_{ij} is the path coefficient. This paper attempts to construct a multi-perception model for environmental responsibility behavior decision-making. Expectation theory believes that in the process of behavioral decision-making evaluation, there are usually two factors, such as the subjective value of individuals and the perception of the results of behavioral decision-making. It is precisely because of materialism that it pays attention to seeking truth from facts, so it is recognized that each person has different judgments, and the value exists in the cognition of the subjective individual and expounds it as a fact. From this, a behavioral evaluation model can be derived.

$$V = \sum_{i=1}^n \pi(P_i)v(x_i). \quad (8)$$

In the above formula, $\pi(P_i)$ is the weight coefficient of the destination in the influencing factors of environmental responsibility behavior decision-making and $v(x_i)$ is the value formed by environmental awareness and environmental attitude in the influencing factors of environmental responsibility behavior decision-making. The magnitude of the value is directly related to environmental awareness and environmental attitude.

3. Experiment

3.1. Data Source

3.1.1. *Survey*. The design of this questionnaire mainly covers three aspects. First, the degree of direct impact of the multiple perception indicator system on the “Internet +” smart environmental protection ecological environment can be divided into five measurement standards: extremely high, higher, average, lower, and extremely low according to the degree of impact; second, whether the multi-perception index system will affect the smart environmental protection

ecological environment through the intermediary variables, and whether it is approved can be divided into five measurement standards: strongly agree, more agree, general, disagree, and strongly disagree; finally, the statistical analysis of demographic characteristic variables mainly includes gender structure, age structure, education level, income level, and source area. According to the statistical data of the survey questionnaire, the respondents were classified and analyzed based on age, education, and occupation, as shown in Table 1.

3.1.2. Survey Objects and Scope. This article selects XX area as the research object. The resources of XX area include mountains, rivers, lakes, springs, waterfalls, caves, sands, seas, customs, cities, harbors, temples, gardens, villas, migratory birds, and rare animals and plants. The survey is conducted by firstly distributing survey questionnaires to residents around the XX area and collecting them in a unified manner, and secondly, randomly checking individual tourists visiting the XX area. The survey was conducted in July-August 2019. A total of 500 questionnaires were issued in the formal survey. 485 valid questionnaires were recovered, with a recovery rate of 97%. 24 invalid questionnaires were removed, and the number of valid questionnaires was 461. The effective rate of recovery was 95.1%.

3.2. Construction of the Indicator System for the Multiple Perception System of the Ecological Environment. Based on the opinions of a survey of 20 experts, the following conclusions can be drawn: first, expert feedback on the first-level indicators. In the first round of expert consultation feedback results, 20 experts generally recognized most of the eight first-level indicators listed in this article. Among them, the five first-level indicators of environmental awareness, environmental attitude, environmental sensitivity, environmental perception, and context variables are highly consistent and have been recognized by all experts. Environmental awareness is a level and degree of people's awareness of the environment and environmental protection, and it is also the consciousness of people's practical activities to continuously adjust their own economic activities and social behaviors to protect the environment and coordinate the relationship between man and the environment, and between man and nature. Second is the expert feedback on secondary indicators. In the first round of expert surveys and consultations, most indicators were unanimously approved by experts. In summary, based on the statistical results of expert consultation and feedback, 6 primary indicators and 22 secondary indicators of the multi-environmental indicator system for ecological environment are constructed, as shown in Table 2.

3.3. AHP-Based Weighting Allocation of Multiple Environmental Indicators. Judgment matrix means that any systematic analysis is based on certain information. The information basis of AHP is mainly the judgments given by people on the relative importance of each factor at each level.

These judgments are expressed by numerical values. Write the result in matrix form. Construct a pairwise comparison judgment matrix. After constructing the indicator system of influencing factors, the affiliation of the elements between the indicators at all levels is determined. In order to ensure that the importance of each influencing factor in the matrix can be displayed in a quantitative manner, it is necessary to introduce a matrix judgment scale and use the 1–9 scale method for judgment, as shown in Table 3.

In this way, for criterion C , the n compared elements form a pairwise comparison judgment matrix:

$$A = (a_{ij})_{n \times n}, a_{ij} > 0, \quad a_{ij} = a_{ji}, \quad a_{ii} = 1, \quad (9)$$

where a_{ij} is the scale of the importance of the elements u_i and u_j relative to C . The judgment matrix has the following properties: the importance ratio of the element a_i to a_j has an inverse relationship, that is,

$$a_{ij} = \frac{1}{a_{ji}}. \quad (10)$$

Normalization is to limit the data that need to be processed (by some algorithm) to a certain range that you need. We call judgment matrix a positive reciprocal matrix. Its properties make us only need $n(n-1)/2$ elements of the upper (or lower) triangle of an n -element judgment matrix, that is to say, only $n(n-1)/2$ judgments are needed. Calculate the consistency ratio CR , test the consistency of the matrix according to $CR = CI/RI$, and set the single rank consistency index of influencing factor R layer R_1, R_2, \dots, R_n to C_j ($j = 1, 2, \dots, m$) in criterion layer C as CI_j , and the random consistency index RI_j ; then, the total rank consistency ratio of the hierarchy is

$$CR = \frac{c_1 CI_1 + c_2 CI_2 + \dots + c_m CI_m}{c_1 RI_1 + c_2 RI_2 + \dots + c_m RI_m}. \quad (11)$$

When $CR < 0.1$, we consider that the degree of inconsistency of the matrix is within the allowable range. At this time, the normalized feature vector can be used as the weight vector. When $CR \geq 0.1$, the judgment matrix should be appropriately modified.

4. Results and Discussions

4.1. Analysis of Indicators Based on the Multiple Perception System of the Ecological Environment

4.1.1. Visual Perception. Fuzzy comprehensive evaluation method is a comprehensive evaluation method based on fuzzy mathematics. This comprehensive evaluation method transforms qualitative evaluation into quantitative evaluation according to the membership degree theory of fuzzy mathematics, that is, using fuzzy mathematics to make a general evaluation of things or objects restricted by many factors. Through the survey of visual perception indicators, the calculation of the survey scores of each indicator is shown in the table, the contribution score of each indicator is calculated based on the

TABLE 1: Statistics of the basic situation of the respondents.

Personal characteristics	Category	Number of people	Percentage (%)
Age	18–24	21	4.6
	25–34	151	32.8
	35–44	259	56.1
	≥45	30	6.5
Education level	High school	85	18.4
	College	110	23.8
	Undergraduate	151	32.8
	Master	41	8.9
	PhD	35	7.6
Occupation	College students	90	19.5
	Civil servants	73	15.8
	Institution	40	8.7
	Enterprise employees	171	37.1
	Teacher	87	18.9

TABLE 2: Ecological environment multiple perception index system.

Indicator category	First-level indicators	Second-level indicators
Intrinsic indicators	Environmental awareness	Environmental awareness Environmental assessment Attribution of liability Subjective norms Behavioral intention
	Environmental attitude	Positive attitude Neutral attitude Negative attitude
	Environmental sensitivity	Environmental problems found Environmental sympathy
	Environmental control concept	Environmental behavior recognition Environmental behavior expectations Environmental collaborative behavior estimation
	Environmental awareness	Environmental behavior prediction Recreational shock perception Environmental policy perception Environmental behavior perception
External indicators	Context variable	Environmental persuasion Environmental demonstration Social morality Environmental regulations Environmental behavior cost

TABLE 3: Matrix judgment scale table.

Relative importance	Definition	Description
1	Equally important	Both goals are equally important
3	Slightly important	From experience or judgment, consider one goal slightly more important than another
5	Quite important	Think of one goal as more important than the other by experience or judgment
7	Obviously important	I feel that one goal is more important than another, and this importance has been proven in practice
9	Absolutely important	Feel strongly that one goal is more important than another
2, 4, 6, 8	The middle value of two adjacent judgments	Use when you need a compromise

comprehensive evaluation function, and a bar graph is drawn, as shown in Figure 1.

As shown in the figure, in the score of the survey indicators, the corresponding indicators from high to low are crop landscape (0.06339), buildings and structures (0.05202), landscape sketches (0.04837), night lights (0.03252), flower garden (0.02213), paving (0.02002), water system landscape (0.01388), and grassland (0.01221). It can be seen that in the overall evaluation of the perception experience, the contribution of the ecological environment element of crop landscape is the largest and the development level is relatively good. The crop landscape, as a smart environmental protection ecological environment, can well reflect the environmental elements, its development level is also good, and it exerts its landscape effect.

4.1.2. Functional Service Awareness. In the study, the survey of functional service perception experience indicators, calculating the contribution score of each indicator, and drawing a bar chart, is shown in Figure 2.

As shown in the figure, in the score of the indicator, the contribution value of the lighting street lamp item is the largest, which is 0.06822, indicating that this item has the largest contribution to the evaluation of the multiple perception system among all elements of the functional service perception experience. The second largest contribution is power supply facilities and rest seats, with corresponding contribution values of 0.06553 and 0.04219, respectively. The contribution of fire hydrants and trash cans is significantly smaller than the previous ones. Among them, the value of trash cans is the smallest, which is 0.01028, indicating that the trash bins in the landscape have a poorer perception of tourists. Trash bins and fire hydrants have a greater positive impact on the functional service perception experience, with corresponding contribution values of 0.1846 and 0.1682, respectively. Therefore, the emphasis on improving the level of functional service perception experience lies in the optimization of trash cans and fire hydrants.

4.1.3. Culture and Activity Perception. Similarly, in the study, according to the questionnaire survey of the degree of preference of cultural and activity experience perception, the contribution score of each indicator was calculated, and a bar chart was drawn to analyze Figure 3.

It can be seen from the data in the figure that the contribution value of each indicator has significant differences. Among them, the e-commerce business contributed the most value, 0.07652. B&B accommodation and product processing experience contribution values were 0.05861 and 0.05121, both of which showed a good contribution to the perception experience. The smallest contribution is the fruit and vegetable picking experience, and the corresponding contribution value is 0.01882. The contribution of indicators to cultural and activity perception is generally consistent with the above. In the evaluation of cultural and event perception experience, the contribution value of e-commerce business is as high as 0.2550, and the contribution is obvious; the next most significant contribution is the bed

and breakfast accommodation and product processing experience, with the contribution values of 0.1625 and 0.1488, respectively. The fruit and vegetable picking experience has the smallest contribution value (0.0266) and has the weakest positive effect on the development of culture and perception experience.

4.2. Analysis of Smart Environmental Protection Ecological Environment Indicators

4.2.1. Environmental Quality. In the study, each indicator's contribution score was calculated, and a bar graph of the environmental quality-level indicator's contribution score was drawn, as shown in Figure 4.

As shown in the figure above, the contribution values of indicators from high to low are annual average precipitation (0.1428), useable land area (0.06338), per capita water resources (0.05586), forest coverage (0.05158), number of natural rivers (0.02329), and the proportion of days with air quality \geq level 2 (0.01121). It can be clearly seen that the most important contribution to the level of the ecological environment is the annual average precipitation, indicating that the region has relatively good water resources. Among them, the contribution of the proportion of days with air quality ≥ 2 is the smallest. The annual average precipitation contributes the largest value, 0.2866, followed by the largest contribution in terms of available land area, forest coverage, and per capita water resources. The corresponding contributions are 0.1539, 0.1455, and 0.1322, all of which contribute to the regional environment. The development of the quality level has a good effect, the forest ecosystem is relatively good, the land use is more reasonable, the degree of land disruption is lower, and it has a richer amount of precipitation.

4.2.2. Environmental Pressure. Contribution values of the four indicators to the ecological environment system and the level of environmental pressure are calculated through calculation, and a bar graph of the environmental pressure indicator contribution score is drawn, as shown in Figure 5.

From the figure, it can be seen that among the contribution of the indicator to the ecological environment, the index of moving households each year has the largest contribution to the ecological environment, with a contribution value of 0.09296. This shows that the indicator system constructed in this paper is relatively reasonable, and the ecological environment is affected relatively well. The second is the corresponding contribution value of the environmental emergency situation: 0.06324. The evaluation value of domestic sewage discharge is 0.03487, which has the smallest contribution, which shows that a large amount of sewage discharge is caused in the process of domestic water use in a smart and environmentally friendly ecological environment, which has a negative degree of local ecological environment. In terms of the contribution of indicators to the development level of environmental pressure, the contribution values of each indicator from high to low are the number of people who move into households every year, environmental emergencies, solid waste production, and

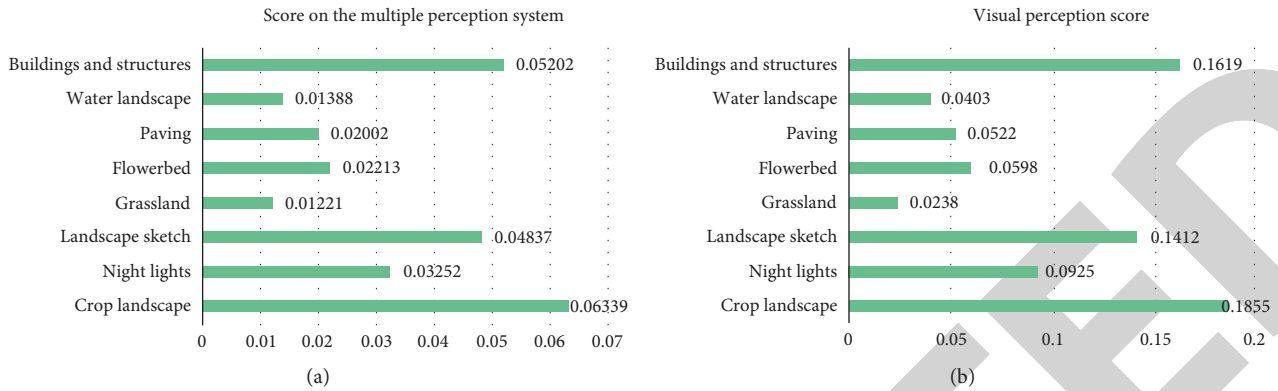


FIGURE 1: Scores of visual perception indicators. (a) Scores for multiple perception systems. (b) Scores for visual perception.

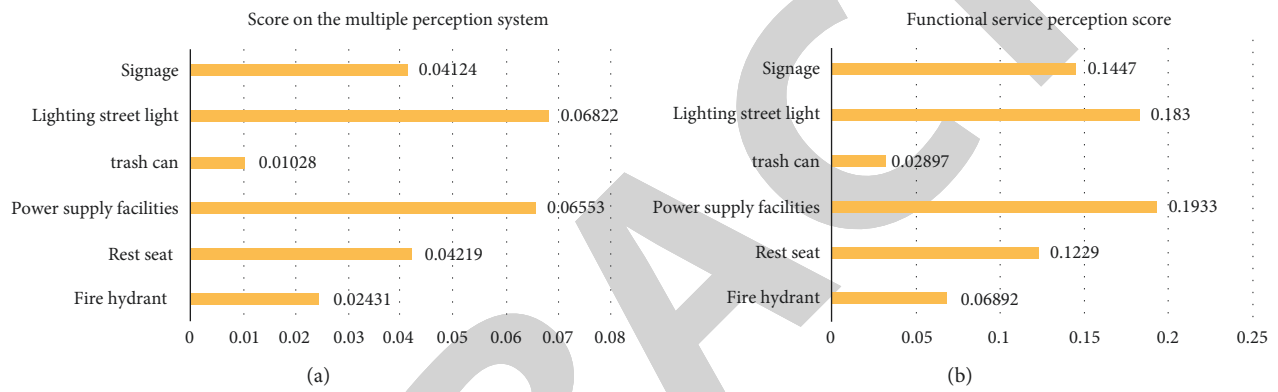


FIGURE 2: Scores of functional service perception indicators. (a) Scores on the multiple perception system. (b) Scores on the perception of functional services.

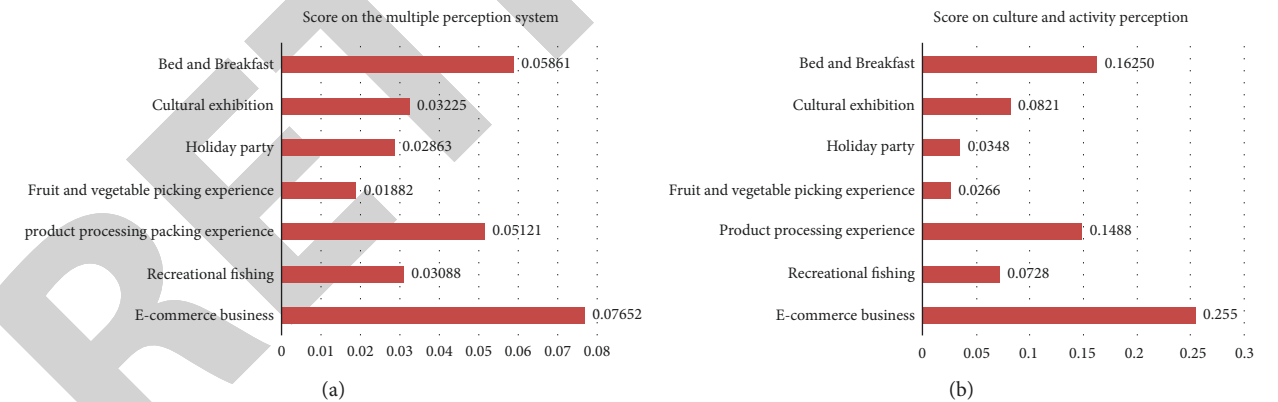


FIGURE 3: Scores of cultural and activity perception indicators. (a) Scores on multiple perception systems. (b) Scores on perceptions of culture and activities.

domestic sewage discharge, with corresponding scores of 0.2837, 0.2122, 0.1588, and 0.0901, respectively.

4.2.3. *Environmental Improvement.* Calculate the contribution score of each indicator, and draw a bar chart of the contribution score of environmental improvement-level indicators, as shown in Figure 6, for analysis.

As shown in the figure, the contribution of the indicators to the level of the ecological environment is as follows: hazardous waste disposal rate (0.06221), domestic sewage treatment rate (0.04723), environmental protection facility input cost (0.02946), and solid waste treatment rate (0.02069). It can be seen that the rate of hazardous waste disposal has the most positive effect on the development of the ecological environment, followed by the rate of domestic sewage treatment. Domestic sewage treatment rate

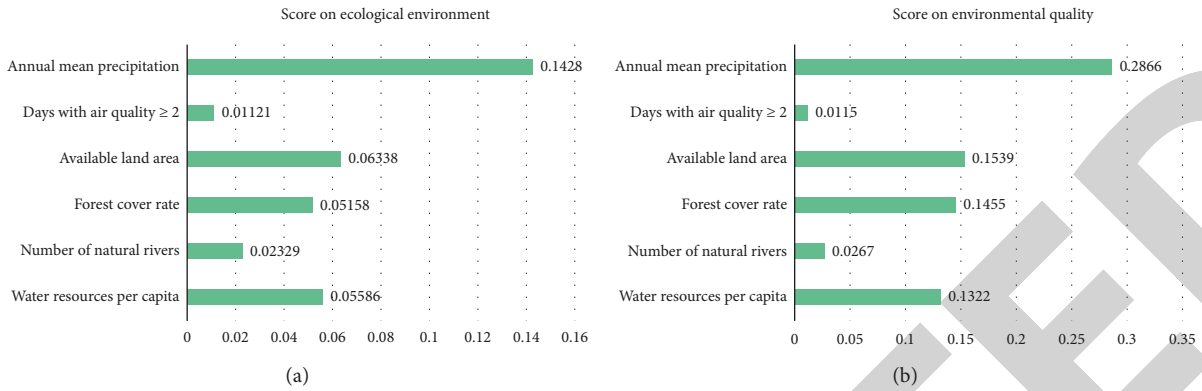


FIGURE 4: Scores of environmental quality-level indicators. (a) Score on ecological environment. (b) Score on environmental quality.

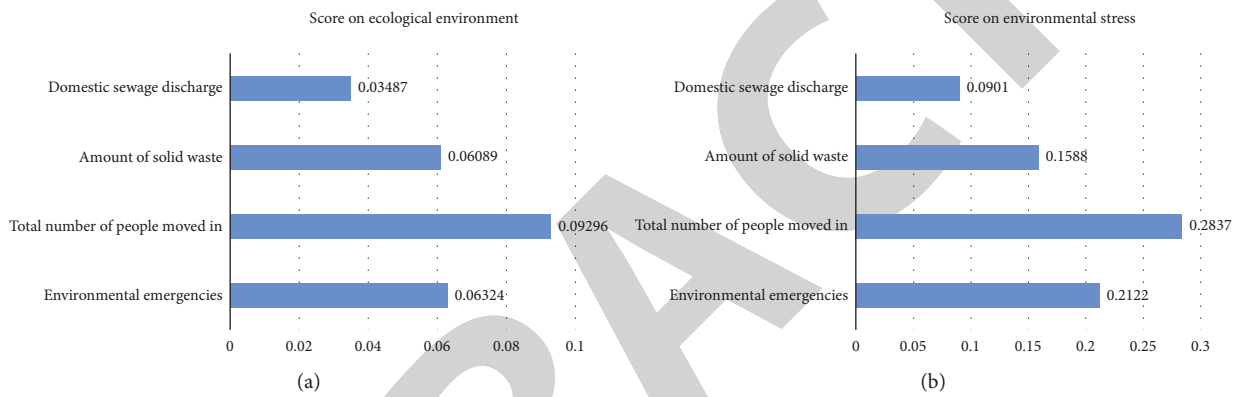


FIGURE 5: Scores of environmental stress indicators. (a) Score on ecological environment. (b) Score on environmental stress.

and hazardous waste disposal rate have a positive impact on the development of environmental improvement level, and their corresponding contribution values are 0.1624 and 0.1722, respectively. Although the work contents corresponding to the remaining two indicators have also achieved certain effects, they are relatively weak and need to be optimized.

4.3. Comprehensive Evaluation of Smart Environmental Protection Ecological Environment Based on Multiple Perception System

4.3.1. Comprehensive Evaluation of Ecological Environment. The comprehensive evaluation of the ecological environment is to evaluate the current development level of the ecological environment. In the study, the total contribution scores of the corresponding indicators to the ecological system under each secondary indicator are calculated, the collective calculation is performed to obtain the contribution scores of the secondary indicators to the ecological environment system, and a bar chart of the secondary indicator contribution score is drawn (Figure 7). The weights of environmental quality level, environmental pressure level, and environmental improvement level are 0.4096, 0.3248, and 0.2756, respectively. According to the calculation formula of the comprehensive evaluation index of ecological

environment, the comprehensive evaluation index values of environmental quality level, environmental pressure level, and environmental improvement level are 0.6731, 0.6112, and 0.4452, respectively.

It can be seen from the comprehensive evaluation of environmental quality level, environmental pressure level, and environmental remediation level, the bar chart of their contribution to the ecological environment system that the contribution of environmental remediation level to the coupling evaluation of ecological environment is the largest, and the corresponding score is 0.3119. Secondly, the environmental pressure level contributed 0.2483, and finally, the environmental quality level contributed 0.1566. The comprehensive evaluation index values of environmental quality level, environmental pressure level, and environmental improvement level are 0.4821, 0.6538, and 0.7122, respectively, and the corresponding evaluation levels are poor environmental quality level, average environmental stress level, and good environmental improvement level. It shows that the overall development level of the ecological environment in the region is good, and the environmental quality level is poor. It is necessary to focus on strengthening the improvement of environmental quality level, optimizing and increasing the level of environmental pressure, and maintaining the joint development of environmental improvement level.

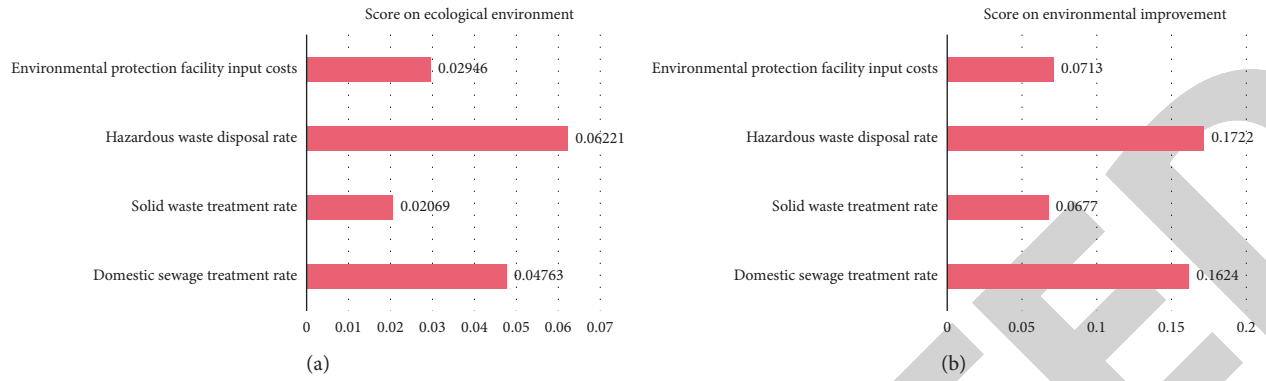


FIGURE 6: Scores of environmental improvement indicators. (a) Score for ecological environment. (b) Score for environmental improvement.

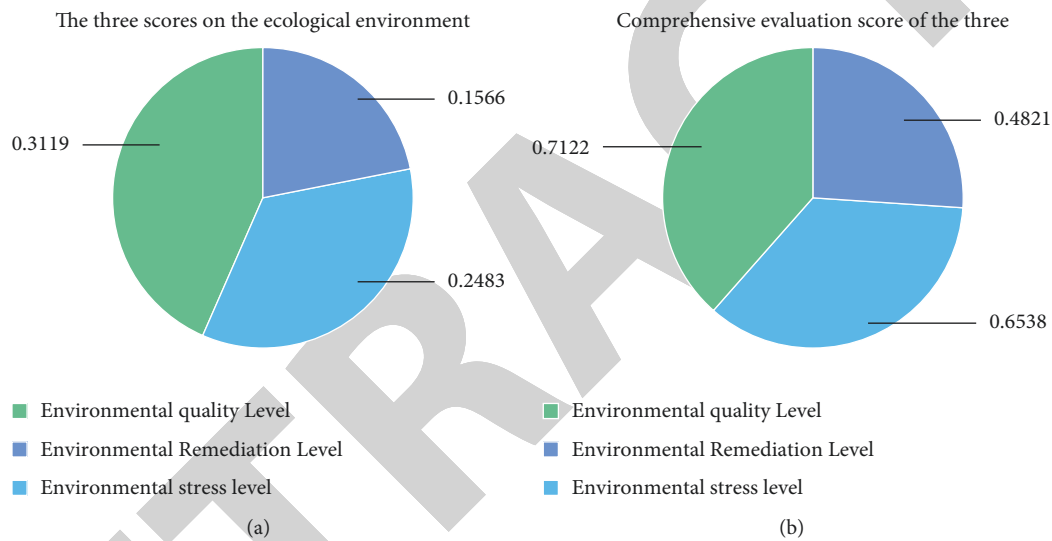


FIGURE 7: Comprehensive evaluation of three indicators and scores on the ecological environment. (a) Score on ecological environment. (b) Comprehensive evaluation score of the three.

4.3.2. *Coordinated Evaluation of Multiple Perception Systems and Ecological Environment.* In the study, based on the multi-perception system, the comprehensive evaluation index of the ecological environment, and the combination and coordination of the two, the coordinated evaluation of the multi-perception system and the ecological environment:

As can be seen from Figure 8, in the entire evaluation system, the coordination degree of the multi-perception system and the ecological environment is 0.9978, and the comprehensive evaluation level is super-high-level coordination. At the same time, the comprehensive evaluation score between the two is 0.8659, and the comprehensive coordination has just reached the excellent coordination level, which indicates that the current multi-perception system is closely connected with the ecological environment,

and there is a strong interaction between them. This kind of interaction basically presents a very good benign effect, which promotes the multiple perception system and the level of the ecological environment, and forms a coordinated development between the two, which has a positive effect on the development of the entire smart environmental protection ecological environment. In addition, the comprehensive evaluation index value of the multiple perception system is 0.7688, and the development level is at a better level, which indicates that the multiple perception system has a better development level and can bring a better experience. The comprehensive evaluation index value of the ecosystem is 0.6237, and the evaluation level is average, reflecting that the ecological environment system has not reached a good level of development, and the development of the multiple perception system is slightly behind.

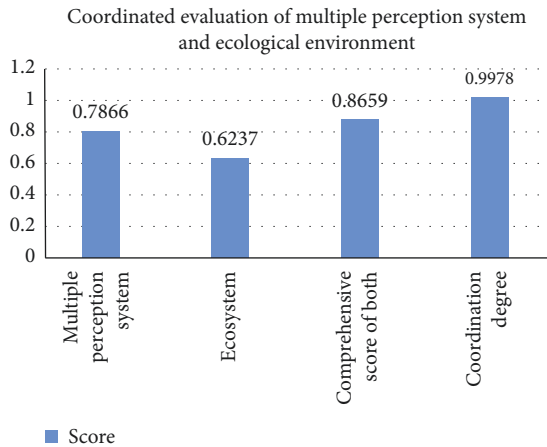


FIGURE 8: Coordinated evaluation scores of multiple perception systems and ecological environment.

5. Conclusions

Based on the “Internet +” and perceived value, this paper systematically studies the dimensions of the driving factors and behavioral decision-making of the smart environmental protection ecological environment, and builds a comprehensive evaluation model of the smart environmental protection ecological environment based on the multiple perception system. In this paper, an evaluation index system consisting of two systems, six secondary indicators, and 22 three-level indicators combined with a multi-perception system and related elements of the ecological environment is established to complete the construction of a comprehensive evaluation model of the smart environmental protection ecological environment of the multi-perception system.

In this paper, the comprehensive evaluation value of the smart environmental protection ecological environment is 0.78595, and the level of the multi-perception system is good. At the same time, the corresponding evaluation values of visual perception, functional service perception, and cultural and activity perception are 0.75431, 0.70196, and 0.78846. The level of development of functional service perception experience is average, while the other two have better development levels. The comprehensive evaluation value of the ecological environment is 0.65734, and the level of ecological environment development is average. The corresponding evaluation values of the subsystem environmental quality level, environmental pressure level, and environmental improvement level are 0.69943, 0.63491, and 0.60279. The development level of the former two is average, and the development level of the latter is poor.

The coordination value of the multi-perception system and the ecological environment is 0.9978, which is an ultra-high-level coordination stage. At this stage, the interaction between the two is strong and affects their development. At the same time, the comprehensive evaluation value of the two is 0.8659, and the perception experience and the ecological environment are in a good coordination level, which influence and promote each other.

Data Availability

No data were used to support this study.

Conflicts of Interest

There are no potential conflicts of interest in this study.

Acknowledgments

This work was supported by Scientific Research Program Funded by Shaanxi Provincial Education Department (Program No. 20JK0160).

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