

Retraction

Retracted: Grey Correlation Analysis of Economic Growth and Cultural Industry Competitiveness

Complexity

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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. Li, "Grey Correlation Analysis of Economic Growth and Cultural Industry Competitiveness," *Complexity*, vol. 2021, Article ID 5594080, 11 pages, 2021.

Research Article

Grey Correlation Analysis of Economic Growth and Cultural Industry Competitiveness

Jian Li 

School of Economic and Management, Qujing Normal University, Qujing, Yunnan 655011, China

Correspondence should be addressed to Jian Li; lijian@mail.qjnu.edu.cn

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The influence of cultural industry competitiveness on economic growth is analyzed by using grey relational degree method. Then, the influence of cultural industry on the three industries is analyzed and compared in the same way. On this basis, further from the cultural industry, the impacts of core layer, outer layer, and related layer on economic growth were compared and analyzed. Finally, the economic growth model is used to measure the impact of investment, labor, and innovation in cultural industry on economic growth. The results show that cultural industry has a great influence on economic growth. The cultural industry has an obvious driving effect on the tertiary industry. The correlative layer of cultural industry has the greatest influence on economic growth. Cultural industry innovation has a huge pulling effect on economic growth. The SPSS software was used to process the data, and the data indicators were screened. Finally, the grey relational degree model was constructed. Then, the improved diamond model was used to select the influential factors of the development of cultural industry, and the main influencing factors were found out through the grey relational degree analysis. This paper analyzes the factors affecting economic benefits and puts forward countermeasures. The results show that it is of great significance to pay attention to the development of cultural manufacturing industry in cultural industry and promote cultural innovation to promote economic growth.

1. Introduction

In recent years, the cultural industry has got off to a good start with a strong momentum of development. However, as a new industry, it is still in the stage of exploration and trial, and the understanding of the cultural industry from all walks of life is not deep enough. Therefore, there are many problems and there is a big gap with western developed countries [1]. Therefore, by analyzing the international competitiveness and influencing factors of the cultural industry, we can know and predict the development trend of the industry and broaden the direction of the operation and management of the employees. At the same time, as another major emerging industry, cultural industry is a key industry in the economic development of all countries in the world, and its influence on promoting economic restructuring and transforming economic development mode cannot be ignored. At present, many countries, especially economically developed countries, have formulated a series of cultural

industry development strategies and policies [2]. As a rapidly developing country, China should seize the opportunity to vigorously develop the cultural industry.

Grey system theory takes “small sample” and “poor information” uncertain systems with “some information known and some information unknown” as the research object, which has a wide range of application fields. Grey relational degree analysis is a method used to analyze the correlation degree of various factors in the system [3, 4]. In short, grey relational analysis is an analytical comparison of geometric shapes between curves. The closer the geometric shapes are, the greater the degree of correlation is, and vice versa [5]. Grey relational degree can be divided into two categories: “partial grey relational degree” and “overall grey relational degree.” The main difference is that the local grey relational degree has a reference sequence, while the global grey relational degree is that any sequence can be a reference sequence [6]. Relevant data of the cultural industry have a wide range of sources and various information, so there

must be some errors. Meanwhile, the development of relevant statistics of the cultural industry is late, so it is difficult to obtain a large amount of accurate data. In order to make the results more scientific and reasonable, this paper adopts the grey relational analysis method.

In this paper, the entropy method is used to determine the weight of each index in the evaluation index system, which can effectively avoid the subjective factors of the subjective weighting method affecting the weight evaluation.

At the same time, the entropy method is improved and the standardized transformation method is used for correction to avoid negative or extreme values of some data in the dimensionless standardized processing process. The grey relational degree method is used to select relevant data, and the quantitative analysis is carried out on each influencing factor index, and the entropy weight method is used to synthesize the total influence degree of several main factors. Based on the analysis results and the actual situation, the paper puts forward the countermeasures to promote the development of cultural industry, which combines theory and practice closely and has both theoretical support and practical value.

2. Related Work

As for the influence of cultural industry on economic growth, scholars have conducted in-depth research from different aspects. The contribution of publishing industry to economic growth is analyzed. The influence of economic growth is analyzed. Time series data are used to illustrate that the development of cultural industry contributes to the improvement of employment level and economic growth in Sweden. The input-output analysis method and CGE model are used to study the operation of cultural industry and how it affects the economy and society [7]. Based on the cross-sectional data of 2001, the empirical study shows that the development of cultural industry has changed the investment mode of enterprises, promoted the upgrading of consumption structure, and promoted economic growth [8]. By constructing a hard index system of cultural soft power, it is proved that cultural soft power directly promotes the GDP growth of Shenzhen Special Economic Zone [9]. An empirical analysis of the input-output model of the cultural industry proves that the cultural industry has strong industrial correlation effect and industrial sweep effect [10]. This paper presents a calculation method of added value of cultural industry based on real quantity data, thus providing a new idea for data measurement of added value of cultural industry [11].

Grey correlation analysis is the basis of grey system theory, is a system analysis method, and is used for quantitative description and comparison of the development situation of the system changes. Based on the mathematical basis of space theory and the four axioms of grey correlation of normalization, even symmetry, wholeness, and proximity, the correlation coefficients and correlation degrees between reference sequence and several grey comparison sequences are determined. The purpose of grey correlation analysis is to seek the main relationship among various factors in the

system and find out the important factors affecting the target value, so as to master the main characteristics of things and promote and guide the rapid and effective development of the system [12, 13]. Based on the four core competencies of the cultural industry, the cultural industry is divided into seven competitive index sectors: industrial strength, industrial benefit, industrial association, industrial resources, industrial capacity, industrial structure, and industrial environment [14, 15]. Based on the theory of new economic growth, five basic factors affecting the development of urban creative industries are found out. Based on the dynamic principle, the dynamic mechanism of the five basic factors is studied and an exploratory influencing factor model for the development of urban creative industries is proposed [16, 17]. The results show that R&D capability and scientific research level are the main driving force for the development of innovative industries; technological capital is a necessary condition element for innovative industries; and government plays an indispensable role in the development of urban creative industries [18]. Select a number of countries to build panel data models, and find out the main factors affecting the trade in creative services through the model. The research shows that the influence degree on the export volume is from large to small: the intensity of government support, the level of economic development, and the intensity of intellectual property protection and human capital [19, 20]. Based on the diamond model, several possible relevant factors are selected by stepwise regression, and the influencing factors of the export competitiveness of cultural and creative products and cultural and creative services are empirically analyzed [21, 22]. It can be seen that the level of economic development, the openness of the government, the cultural market, and the investment in the research and development of the cultural industry have a relatively large impact on cultural and creative products, while the level of residents' consumption, foreign direct investment, and the openness of the cultural market all have a positive impact on cultural and creative services [23, 24]. It is believed that the influence of science and technology factors on the development of creative industries is the largest, especially the increase of scientific and technological personnel and R&D investment. The factors that affect the development of creative industry and cultural degree are not big [25, 26]. The global Moran index and local Moran scatter plots of 31 central provinces, autonomous regions, and municipalities are used to analyze the spatial field of the development of cultural and creative industries; spatial econometric models are used to analyze the impact of talent, technology, inclusiveness, and infrastructure on the development of cultural and creative industries [27, 28]. The results show that technological factors play the most important role in promoting the development of cultural and creative industries in the current region. Secondly, we consider tolerance and talent factors. The influence of infrastructure and government policies is not obvious [29, 30]. Based on diamond model, the demand for human resources, factors, capital input, technology level, relevant industry, and support industry and government influence factors such as regression analysis, it is concluded that the creative cultural industry,

scientific research institutions from personnel of course of study, and creative cultural industry organization number of creative cultural products trade have a positive influence; in addition, there are no important research institutions. [31–33]. The research shows that the government's support for the industry has the largest influence on the competitiveness, followed by the protection of human capital and intellectual property rights [34].

Scholars' studies from different perspectives have confirmed to a certain extent that cultural industry has a significant promoting effect on economic growth. However, there are few literature reports on the comparative analysis of different levels of cultural industry on economic growth and the quantitative analysis of the influence of different elements on economic growth. To explore these problems, on the one hand, can promote the further theoretical research; on the other hand, it will also make the formulation of national policy more targeted.

3. Grey Correlation Analysis of Cultural Industry and Its Various Levels and Economic Growth

Relevant data of the cultural industry have a wide range of sources and various information, so there must be some errors. Meanwhile, the development of relevant statistics of the cultural industry is late, so it is difficult to obtain a large amount of accurate data. In order to make the results more scientific and reasonable, this paper adopts the grey relational analysis method.

Steps of association analysis are as follows:

- (1) Determine your reference sequence. The reference sequence is the parent sequence for comparison.
- (2) Dimensionless. In this paper, the method of initial value is used to conduct dimensionless processing on the data; that is, all the data in the same sequence are divided by the first data to get a new sequence.
- (3) Calculate the absolute difference sequence; that is, calculate the absolute difference between the reference sequence and the i th comparison sequence at time k , respectively.
- (4) Determine the resolution factor P . The range of resolution coefficient P is 0.
- (5) Calculate the correlation coefficient; that is, compare the relative difference between the sequence and the reference sequence at the KTH moment.

$$\varepsilon(k) = \frac{\Delta(\max) + P^* \Delta(\max)}{P^* \Delta(\max) + y_0(k) - y_i(k)} \quad (1)$$

- (6) Find the correlation.

Its association analysis frame diagram is shown in Figure 1.

Table 1 reports GDP, the value added of the cultural industry, as well as the value added of the primary industry, secondary industry, and tertiary industry, where GDP is denoted as X_0 sequence, and the value added of cultural

industry, the value added of primary industry, the value added of secondary industry, and the value added of tertiary industry are denoted as X_1 , X_2 , X_3 , and X_4 sequences, respectively. X_0 is the reference sequence, and X_1 , X_2 , X_3 , and X_4 are the comparison sequences. The grey relational degree calculation model is used to represent the grey relational degree between the reference sequence X_0 and the comparison sequences X_1 , X_2 , X_3 , and X_4 after calculation.

In Table 1, the grey correlation degree of the value added of cultural industry and the value added of the three major industries is calculated, where the grey correlation degrees of the value added of cultural industry and the value added of the primary industry, the secondary industry, and the tertiary industry are, respectively, represented. Table 2 reports the grey correlation degree between the value added of cultural industry and the three major industries. As can be seen from Table 2, the correlation between the value added of the primary industry and the value added of the cultural industry is in the middle, and the value added of the secondary industry and the value added of the cultural industry are the lowest.

The results obtained by using the grey relational analysis method seem to contradict our experience. Most views hold that the degree of correlation between the primary industry and the cultural industry should be low, while the degree of correlation between the secondary industry and the cultural industry should be high. Therefore, we further analyze how the result of grey correlation degree is obtained.

The core meaning of grey relational degree analysis is as follows: after dimensionless processing, the relative difference between each sequence and the reference sequence at different time points or states is compared (relative difference is negatively correlated with absolute difference), and the larger the average relative difference is, the greater the correlation between the sequences is.

The core meaning of grey relational degree analysis is that, after dimensionless processing, the relative difference between each sequence and the reference sequence is compared at different time points or states. The larger the average relative deviation is, the greater the correlation degree between the sequences will be. As shown in Figure 2, after dimensionless treatment, the absolute difference between the value added of the tertiary industry and the value added of the cultural industry is the least. Although there are abnormal situations in the tertiary industry at the end, it has no significant impact on the result. Secondly, the value added of the primary industry and the value added of the cultural industry are also quite close in the middle, and the absolute difference between the two is small at each time point, so the grey correlation degree of the two is also high. Finally, although the curve trend of the value added of the secondary industry and the cultural industry is relatively consistent after dimensionless treatment, the absolute difference between the two is large, indicating a low degree of correlation. In the division of cultural industry, the core layer and outer layer of cultural industry mostly belong to the tertiary industry, and the development of cultural industry has a substantial impact on promoting the

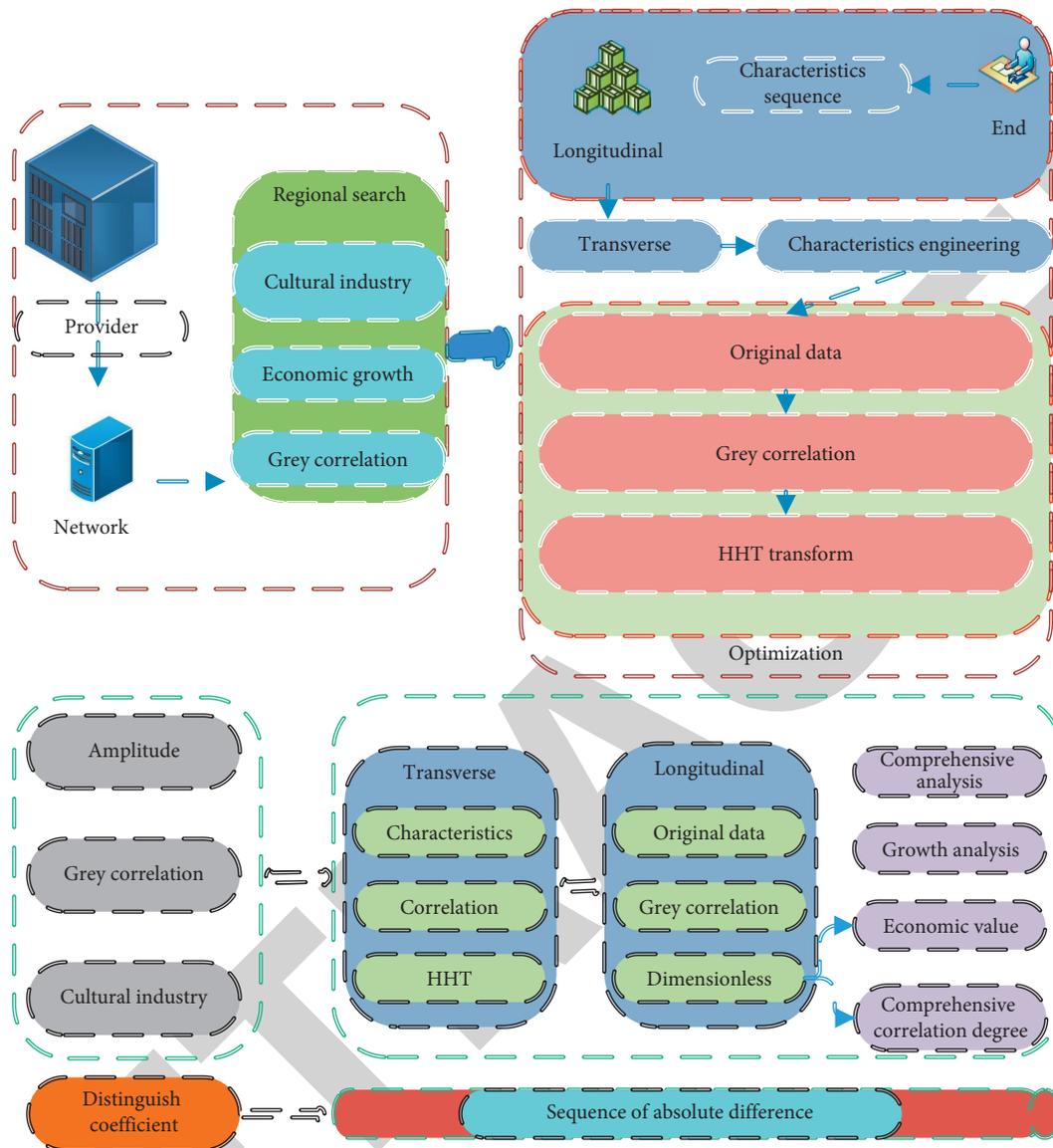


FIGURE 1: Analysis of cultural industry and economic growth based on grey correlation degree.

TABLE 1: GDP, value added of cultural industry, and value added of three major industries.

Reference sequence		Comparison sequences			
Year	GDP, X0	Value added of cultural industry X1	Output value of the primary industry will increase by X2	Output value of the secondary industry increased by X3	Output value of the tertiary industry increased by X4
2003	13.5	0.37	1.73	6.23	5.7
2004	15.98	0.33	2.15	7.38	6.34
2005	18.34	0.42	2.23	8.78	7.32
2006	21.32	0.52	2.42	10.34	8.45
2007	25.94	0.63	2.78	12.34	10.38
2008	30.23	0.75	3.42	15.32	12.03
2009	34.06	0.83	3.54	16.67	14.76

TABLE 2: Correlation analysis of value added of cultural industry and value added of three major industries.

R11	R12	R13	R14
Numerical	0.5976	0.5243	0.6782

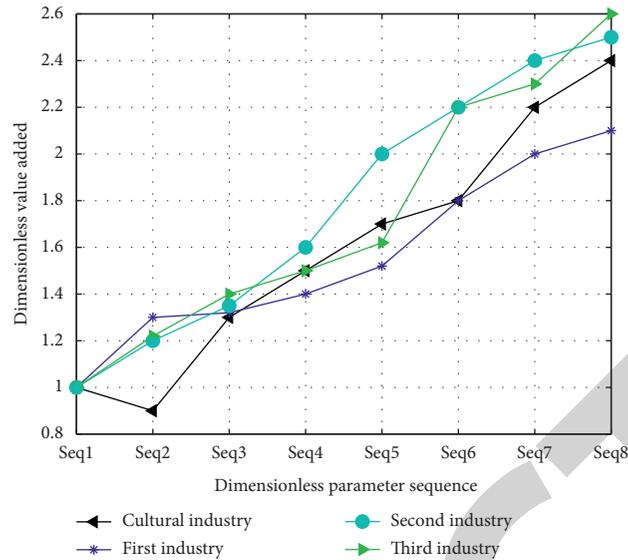


FIGURE 2: Numerical comparison diagram of the value added of cultural industry and the value added of three major industries after dimensionless treatment.

development of the tertiary industry. In recent years, a large number of cultural and entertainment industries, radio, film, and television industries, as well as cultural and art industries, which originally had a small proportion in the tertiary industry, have risen rapidly, and their development speed far exceeds the traditional service industries, such as catering industry and posts and telecommunications industry. Moreover, in recent years, a number of new industries, such as network culture industry and information culture industry, have sprung up. Through these services of cultural industry, the new culture can rapidly infiltrate into the traditional third industry, such as food and beverage industry, cultural industry, and other industries, greatly promote the cultural content of the industry and economic value, derive a new food culture, cultural industry, and so forth, leading to the third industry internal structure adjustment, and promote the increase of the value added of tertiary industry.

Table 3 reports GDP and output value table of core layer, outer layer, and related layer of cultural industry. GDP is the reference sequence X0, and the output value of the core layer, the output value of the outer layer, and the output value of the related layer are the reference sequences X5, X6, and X7. The calculated value represents the grey correlation degree between the reference sequence X0 and the comparison sequences X5, X6, and X7.

Table 4 reports the correlation degree between GDP and output value of core layer, outer layer, and related layer of cultural industry. It can be seen from Table 4 that the correlation between the output value of the related layer and GDP is the strongest, and the grey correlation is as high as 0.97, which is far greater than the correlation between the output value of the core layer and the output value of the outer layer and GDP. In other words, the influence of the output value of the related layer on GDP is greater than that of the output value of the core layer and the outer layer.

In the cultural industry, the core layer occupies a dominant position. Without the core layer to create new cultural creativity, the development of the outer layer and related layers would be out of question. The core layer of cultural industry has a huge radiation effect on the outer layer and the related layer, and the output value created by the related layer even exceeds that created by the core layer. Among them, the contribution of output value of related layer to economic growth is very obvious.

The development of cultural content industry at the core level requires a high level of informatization and digital technology to a large extent. At present, the integration of high-tech technology and culture is not very mature, the technology platform and independent research and development ability are still relatively backward, and culture and technology have not become the dominant mode of cultural industry development. Moreover, the production of cultural content is slow, the cycle is long, and the threshold is high, which makes some small- and medium-sized enterprises lack talents and scientific and technological levels shrink back from the cultural content industry. The above two reasons limit the development speed of the core layer of cultural industry to a certain extent. The cultural content industry in the core layer is the embodiment of the core competitiveness of the cultural industry. Although the output value of the core layer has been greatly improved in recent years, its influence on the economy is still less than that of the related layer industries.

The outer layer of cultural industry mainly includes network cultural services mainly based on Internet information, cultural leisure and entertainment services mainly based on cultural industry and entertainment, and other cultural services mainly based on advertising, exhibition, and cultural business agency. The outer layer not only is influenced by the core layer but also provides channels and technical support for the dissemination of cultural content.

TABLE 3: GDP and output value of core layer, outer layer, and related layer of cultural industry.

Year	GDP, X0	Core layer output, X5	Output value of the outer layer, X6	Output value of related layer, X7
2003	13.5274	0.1884	0.08235	0.1859
2004	15.9577	0.2121	0.0634	0.1384
2005	18.4079	0.2619	0.0876	0.1882
2006	21.3132	0.2138	0.0876	0.193
2007	25.8259	0.2693	0.1245	0.2566
2008	30.2786	0.2522	0.2345	0.2673

TABLE 4: Correlation degree of GDP and output value of core layer, outer layer, and related layer of cultural industry.

R01	R02	R03	R04
Data	0.7923	0.7269	0.9734

If the media industry does not receive the corresponding technical support at the core layer and the publishing industry, the output of cultural content cannot reach the peripheral proportion in the cultural industry structure; instead, it will increase economic growth and the pulling effect of the relevant layer and the core layer. Online cultural services and leisure industries are the general trends in the development of cultural industries and are gradually becoming important engines for the incremental upgrading of cultural industries.

4. Grey Correlation Analysis of Economic Growth and Cultural Industry Based on Entropy Masonry Model

Trade competitiveness index is DC index, which focuses on measuring the international competitiveness level of a country's X industry from the scale of trade. Refer to the proportion of the balance between a country's exports and imports in its total import and export trade. DC index is expressed as follows:

$$DC = \frac{X_{ij} - N_{ij}}{X_{ij} + N_{ij}}. \quad (2)$$

Revealing comparative advantage index, namely, RC index, aims to quantitatively describe the relative export performance of a certain industry of a country. The share of the industry in the country's exports is expressed by the share of the industry in the total world trade. RC index excludes the influence of national and world total fluctuations, which can better reflect the relative advantage of a country's export of a certain industry compared with the world average export level. Its calculation formula is as follows:

$$RC = \frac{y_{ij}/y_{iu}}{y_{it}/y_{wt}}. \quad (3)$$

Entropy is measuring the size of the information contained in assessment information mainly used to reflect the fuzzy degree of fuzzy number, the membership degree of fuzzy set to add, expounds the concept of intuitionistic fuzzy

sets and algorithm, and, combined with the nature of the intuitionistic fuzzy entropy formula and its related features, intuitionistic fuzzy entropy is proposed from the scholars study, forming different intuition. Fuzzy entropy is used to measure the uncertainty and fuzziness information of intuitionistic fuzzy elements and intuitionistic fuzzy sets. According to the evaluation information of the intuitionistic fuzzy element, the weight of each expert can be based on the intuitionistic fuzzy entropy. Since the magnitude of fuzzy entropy reflects uncertainty and ambiguity, the larger the fuzzy entropy of the instruction, the more fuzzy the evaluation given by the expert, and the smaller the weight assigned; on the contrary, the more intuitive fuzzy entropy assigns the smaller expert weight.

Intuitionistic fuzzy sets are part of the fuzzy multiple attribute decision-making; this kind of decision problem is characterized by evaluation decision information of intuitionistic fuzzy numbers; Some scholars intuitively extend fuzzy decision-making to TOPSIS, using the decision-making of the positive and negative ideal solution, through the degree of each scheme and ideal scheme decision and to use the grey relational analysis method to solve through weighted operator processing of intuitionistic fuzzy multiple attribute decision-making problems, according to the correlation for preferential treatment, first to calculate the grey correlation and grey correlation coefficient:

$$\varepsilon(j) = \frac{\min_j DC + P^* \max_j DC}{DC + P^* \max_j DC}. \quad (4)$$

For the solution of optimal value as a reference standard, each target through computed alternatives and the correlation through grey correlation coefficient reflect the good degree of each scheme index, finally, assembled into grey correlation, and the maximum correlation shows the comprehensive optimal attribute index, so this plan is the need of the optimal solution.

Firstly, the steps of intuitionistic fuzzy multiattribute decision-making based on grey relational degree analysis are given as follows (Figure 3):

- (1) Step 1: convert the attribute value of the decision into a positive index through the complement of the intuitionistic fuzzy set.
- (2) Step 2: calculate the weight value of each expert under each scheme attribute according to the projection method.
- (3) Step 3: calculate the weight of experts according to intuitionistic fuzzy information entropy.

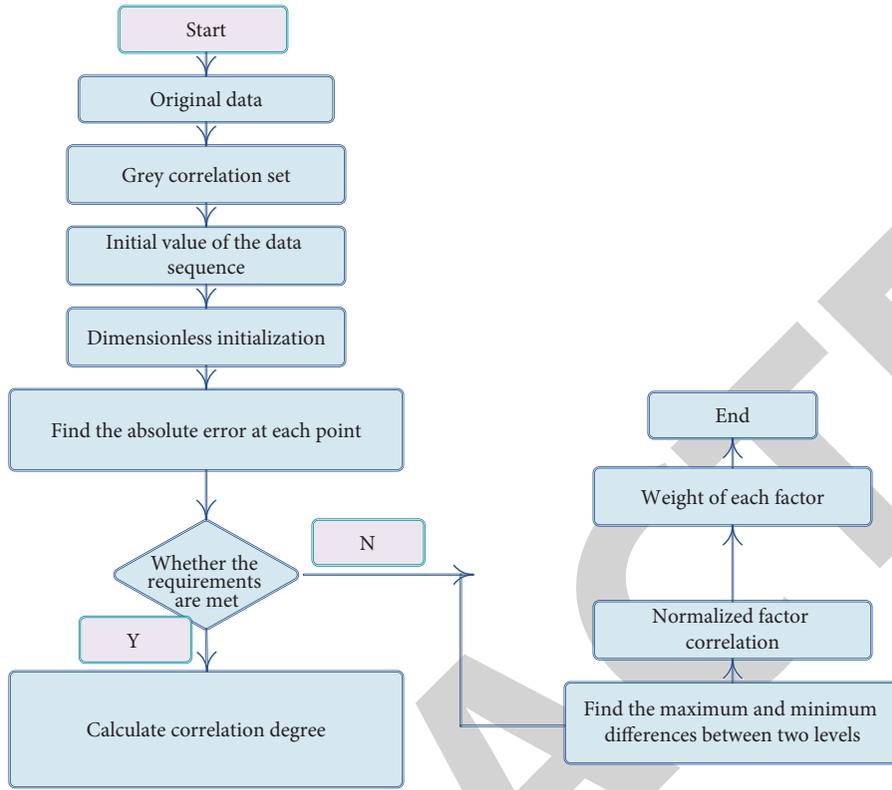


FIGURE 3: Grey correlation analysis flow chart of masonry model based on entropy value.

(4) Step 4: adjust the weight under the scheme attribute by expert fuzzy weight.

(5) Step 5: get the distance of score function based on weighted intuitionistic fuzzy matrix.

(6) Step 6: finally, calculate the grey correlation degree of each scheme, and rank the alternative schemes. The flow chart is shown in Figure 3.

Entropy method mainly consists of the following steps:

- (1) Collection and collation of original data. The evaluation index system is composed of one or more countries with a time span of m years and n indicators. Then an initial data matrix composed of m samples and made comprehensive evaluation with n indicators can be formed:

$$Y = \begin{bmatrix} y_{11} & \cdots & y_{1m} \\ \cdots & & \cdots \\ y_{n1} & \cdots & y_{nm} \end{bmatrix}. \quad (5)$$

- (2) Data processing-standardization processing. In order to eliminate the impact of different dimensions or orders of magnitude of each index on the evaluation results, it is necessary to standardize each index.

$$y_{ij} = \frac{y_j - y_{\min}}{y_{\max} - y_{\min}}. \quad (6)$$

Calculate the proportion of the index value in year I of the j index.

- (3) Calculate the index information entropy value E and information utility value D .

The formula for calculating the information entropy of the JTH index is as follows:

$$t_j = -K \sum y_{ij} \ln y_{ij}. \quad (7)$$

The information utility value of an index directly affects the weight, which depends on the difference between the information entropy of the index and 1. The greater the information utility value is, the greater the importance and weight of the evaluation will be.

- (4) Calculate the weight of evaluation indexes. The entropy method is used to estimate the weight of each index, and the value coefficient of the index information is used for calculation. The higher the value coefficient is, the more important it is to the evaluation. The weight of the j index is

$$\omega_j = \frac{1 - t_j}{\sum 1 - t_j}. \quad (8)$$

In the entropy value method model, the weight of each index is objectively assigned. According to the steps of entropy value method introduced above, the standardized matrix and the weight of each index can be obtained. Due to

TABLE 5: Indexes of cultural industry trade.

Indicators	TC	RCA	SCA	MI
Weight	0.2405	0.2873	0.2778	0.2156

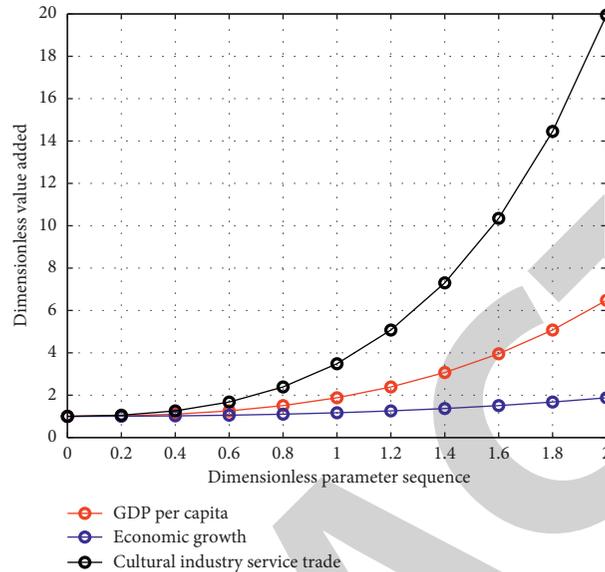


FIGURE 4: The change trend of economic growth and trade in services of cultural industry under grey correlation degree analysis.

the large amount of calculation, only the weights of each index of product trade and service trade in 2015 are selected for listing, as shown in Table 5.

5. Results Analysis

The GDP of a province from 2004 to 2015 and the value added of three industries, culture, and related industries are shown in Table 1. Taking GDP as the reference sequence and the value added of the three industries, culture, and related industries as the comparative sequences, Deng's correlation degree was calculated, and the correlation degree of the value added of the three industries, culture, and related industries and GDP was, respectively, 0.57, 0.91, 0.93, and 0.64. Among them, the correlation between the value added of the secondary and tertiary industries and GDP is greater than or equal to 0.66, which is a strong correlation, indicating that the secondary and tertiary industries are the main engines of sustained economic growth.

Respectively, in the value added of the second and the third industry as the reference sequence and the value added of culture and related industries as comparative sequence, representing the correlation calculation, 0.59 and 0.65, are moderate association, suggesting that the development of cultural creative industries is not entirely out of traditional industries, and the pattern of intersection between the industries can produce certain cultural traits and characteristics of the modern culture creative product, service, also can pass the culture creative products leading to the development of part of the decline of traditional industries.

As can be seen from Figure 4, both per capita GDP and urban residents' disposable income have a similar change trend with the trade in knowledge-based services, but the change range is smaller than that of the total trade in knowledge-based services, and the per capita GDP is relatively closer.

Based on calculating the related data in Table 1, the results in Table 6 use knowledge-based service trade and value-added as the reference sequence to calculate the gray correlation data obtained in the two groups, including production factors, demand conditions, related supporting industries, corporate strategic structure, and competition. It also includes a column of the degree of correlation between the government level and the benchmark index series.

As can be seen from Figure 5, the score of China's cultural industry in the trade of creative industry products is significantly higher than that of the other three countries, with little fluctuation. Except for the decline in competitiveness due to the financial crisis in 2008, China has always been ahead of other countries. India's product trade culture industry is stronger, but its score is more volatile. Brazil's product trade is less competitive and is still declining. The international competitiveness of Russian product trade is very weak, so we should vigorously develop the trade of creative products.

Figure 6 is the regression standardized residual histogram, and the curve on the histogram is the normal curve of the residual value, indicating that the residual distribution of grey relational degree analysis follows the normal curve.

Finally, we look at the residual scatter in Figure 7. The abscissa in the figure is the regression standardized predicted

TABLE 6: Grey correlation degree and ranking of influencing factors in diamond model.

	Indicators	Entropy weight	Grey correlation	Weighted average	Sorting
Factors of production	X1	0.2155	0.703	0.868	2
	X2	0.0182	0.685		
	X3	0.7654	0.904		
Demand conditions	X4	0.5832	0.715	0.716	1
	X5	0.4168	0.692		
Related supporting industries	X6	0.3435	0.762	0.7586	3
	X7	0.2294	0.674		
	X8	0.4271	0.802		

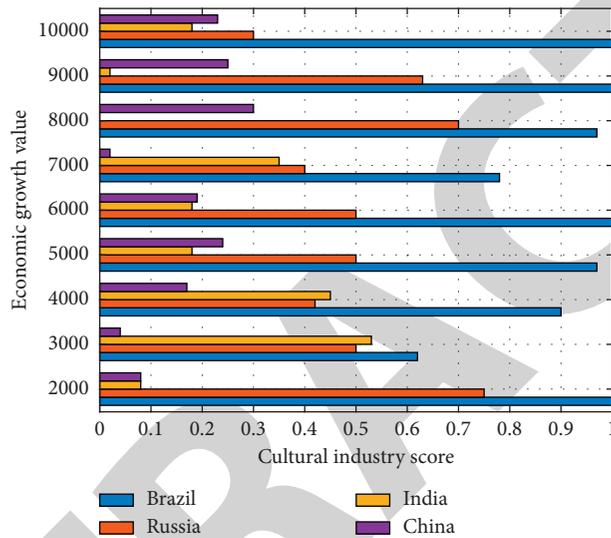


FIGURE 5: Changes in economic growth competitiveness scores of cultural industries.

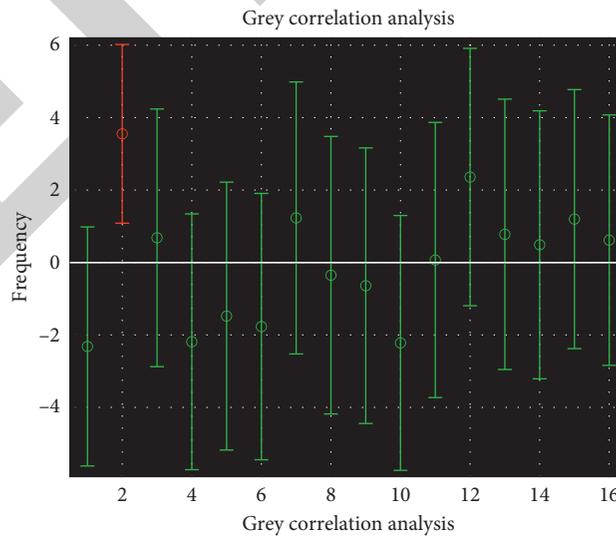


FIGURE 6: Histogram of regression standardized residual in grey relational analysis.

value (dependent variable predicted value), that is, the predicted value of GDP calculated by the real value of cultural industry income and the fitting linear equation. A numerical value with a standardized processing is taken as

the abscissa. The vertical coordinate is the residual (the residual value between 142 and 160 is an ideal state). Through regression analysis, we can get a quantitative causal relationship between the two variables.

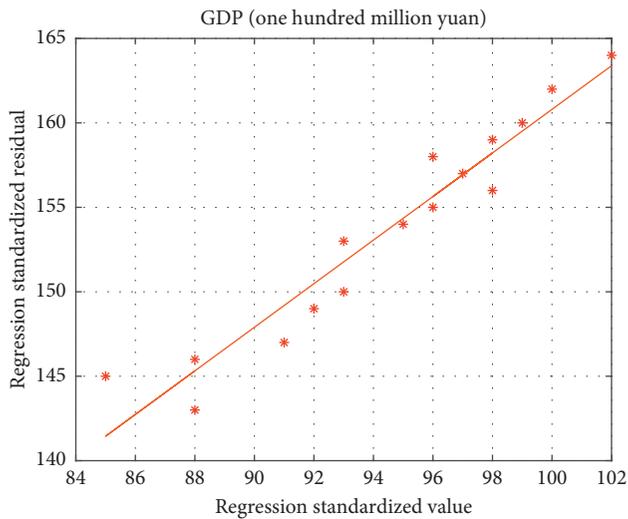


FIGURE 7: Grey correlation analysis residual scatter diagram.

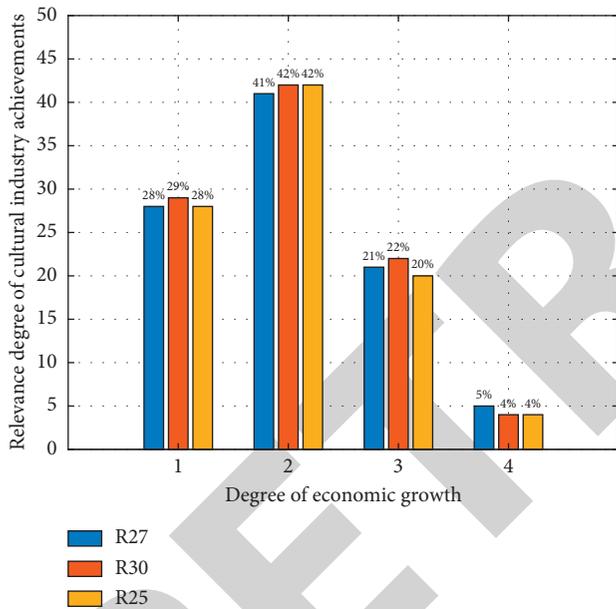


FIGURE 8: Bar chart of correlation degree between economic benefits and cultural industry achievements.

The correlation degree between creative achievements and economic benefits is presented, as shown in Figure 8. Among them, R27, R30, and R25 are within the range [0.04, 0.42], and their influence on the economic returns of the cultural industry is from strong to weak.

6. Conclusion

Firstly, this paper analyzes the influence of cultural industry on GDP and three major industries by using the grey relational degree method. Secondly, using the same method, the influences of core layer, outer layer, and related layer of cultural industry on economic growth are compared and analyzed. Thirdly, on the basis of the above analysis, this paper uses the economic growth model to measure the

impact of investment, labor, and innovation in cultural industry on economic growth. The development of cultural industry has an important impact on economic growth. Through the grey correlation analysis, the cultural industry has a strong driving effect on economic growth, and its influence on GDP even exceeds that of the primary industry. Among the three industries, the development of cultural industry has the most obvious impact on the tertiary industry. The influence of cultural industry on primary industry is greater than that of cultural industry on secondary industry. The related layers of cultural industry have a strong influence on economic growth. Among the core layer, outer layer, and related layer of cultural industry, the influence of the related layer on economic growth is more than that of the core layer and outer layer. Cultural innovation is the most important factor that can promote economic growth in the cultural industry. Capital investment also has an important impact on the development of cultural industry and economic growth, while the labor factor has little impact.

Data Availability

The 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.

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