The Influencing Factors and Empirical Analysis of the Development of Cultural Tourism Industry Integration in Guangxi

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Abstract. This paper mainly adopts the method of combining qualitative and quantitative research to analyze the influencing factors of the integrated development of cultural and tourism industries in Guangxi, and empirically analyze the development level of the integrated industry of cultural and tourism industries. First, it analyzes the current situation of cultural and tourism industries, and then measures and analyzes the integrated development of cultural and tourism industries. It is necessary to explore the issue of measuring the level of industrial integration based on further integration. The research method is based on the statistical data of Guangxi's cultural and tourism industries from 2010 to 2020. The weight of each index in the evaluation index system of the integration development of Guangxi's cultural and tourism industries is measured by entropy method, and the evaluation index of the development level of Guangxi's cultural and tourism industries is analyzed. Then, the development trend and level of both industries are analyzed on this basis. According to the coupling co-scheduling model, the coupling co-scheduling of the development of cultural tourism industry integration is measured, and this indicator can be used to measure the evolution process and change trend of the development level of cultural tourism industry integration. The grey coordination degree model measures the contribution level and grey correlation degree of each index of the cultural tourism subsystem in the cultural tourism integration to the coupling degree, and further analyzes the main indicators that affect the coordination degree of the cultural tourism industry coupling. Among the economic indicators, the proportion of tourism income to GDP, the number of libraries in the cultural industry and other six indicators are key indicators that affect the development of the cultural tourism industry integration, The input of factors should be increased. The paper makes empirical analysis on the development level of cultural tourism industry integration, and provides quantitative support for improving the development strategy of cultural tourism industry integration in Guangxi.

Keywords: Culture and tourism industry · Industrial integration · Influencing factors · Empirical analysis · STATA software

1 Introduction

Guangxi province is located in the south of China. It is a minority autonomous region mainly represented by the Zhuang nationality. The landform is mainly characterized by mountainous and hilly basins. It not only has rich natural scenic tourism resources, but also has ethnic minority cultural resources with the main content of "Eight Guangxi Culture". In 2018, after the establishment of the Ministry of Culture and Tourism, Guangxi has become an important area for the integrated development of China's culture and tourism industry. The protection and inheritance of minority cultural industries and the development and utilization of natural tourism resources have become the key points. The integration of cultural tourism industry has become the social focus and the new economic growth point. Guangxi's "Fourteenth Five-Year Plan" cultural tourism development plan clearly proposes to build a modern cultural industry and tourism system, to optimize the industrial layout and structure, to expand the supply of high-quality cultural products and tourism products, to deeply promote the integrated development of cultural and tourism industries, and to establish a modern cultural industry and tourism system with high scientific and technological content, excellent innovation ability and strong driving role.

Culture is the soul of tourism while tourism is the carrier of culture. They complement each other and are inseparable. Culture is ideological and spiritual, and tourism is physical and material. Only when cultural industry and tourism industry are combined can they be promoted together. This paper studies the degree of integration of Guangxi's cultural and tourism industries, aiming to improve the contribution of Guangxi's cultural and tourism industries to economic growth, and provide suggestions for the sustainable development of Guangxi's cultural and tourism industry integration.

2 Literature Review on the Integrated Development of Culture Tourism Industry

With the integration and development of China's cultural industry and tourism industry, scholars have gradually strengthened their research on the integration of cultural and tourism industry. Some scholars' research on the integration of cultural and tourism industry is based on qualitative description, focusing on the concept and mode of industrial integration. From the perspective of research methods and contents, many scholars began to study the level of cultural tourism industry integration and analyze the construction of integration system. This paper analyzes the integration level measurement of China's cultural industry and tourism industry from a quantitative perspective, establishes the evaluation index system and model judgment criteria for cultural and tourism industry integration, and identifies the degree of cultural and tourism industry integration. From the perspective of the integration of culture and tourism industry, scholars have tried to combine the theory of more disciplines with the industry to understand the integration of culture and tourism industry. One of the most widely used methods is the analysis of the coupling degree. Richards, G. (2018) [1], In the past 10 years, scholars' research on cultural tourism has focused on cultural consumption, cultural motivation, heritage protection, cultural tourism economics and other aspects. The main

research trends include the transformation from material heritage to intangible heritage, more attention to indigenous and other minorities, and the expansion of the geographical scope of cultural tourism research.MA Bo, ZHANG Yue(2020) [2], constructed a four-quadrant model of cultural and tourism integration, which systematically presents the overall picture, stage characteristics and transformation process of cultural and tourism integration based on the vertical axis of "physical culture - organic culture" and the horizontal axis of "tourism industry – tourism". Chen Mo Ying (2022) [3], in combination with the government's requirements for the high-quality development of cultural tourism industry, explored the new direction of the integrated development of culture and tourism industry, and explored the new path of high-quality development of cultural tourism from six aspects, including brand, talent, digitalization, publicity, operation, and government support. Alexan-dros A (2003) [4], has constructed a cultural heritage tourism integration model from the perspective of meaning, motivation and authenticity. Krakowiak B (2013) [5], believes that Polish museums can have a certain impact on the development of local cultural tourism. In terms of driving factors, the most important driving factor for the integration of culture and tourism is creativity. Juzefovie A (2015) [6], believes that creativity enriches the connotation of cultural tourism. Zou Quan (2020) [7], from the perspective of synergy measurement and integration of tourism and cultural industries, explored the deep internal relationship of cultural tourism, adopted the factor analysis method, built the coordination model, built the synergy measurement index system of tourism and cultural industries, and measured the synergy of tourism and cultural industries. WANG Xiu Wei(2020) [8],evaluated the development level of the cultural and tourism industry in the Grand Canal Cultural Belt through the entropy method, and combined with the evaluation results of the level measurement and development trend, proposed that it should be based on the level and development trend of cultural and tourism integration in various provinces and cities, and targeted to fill the gaps and bridge the gap, so as to achieve the stable development of regional cultural and tourism integration. Cheng Yu et al. (2022) [9], Starting from the coupling coordination degree and grade of industrial development level evaluation, the paper uses the analysis method of multiple indicators comprehensive evaluation to compare the development level of cultural tourism industry, reflecting the relative priority of different industries in the process of integrated development. Wang Qin and Huang Dayong (2019) [10], constructed the development evaluation system of the cultural and tourism industry from the two levels of industrial factors and industrial performance, and accurately evaluated the development trend of the cultural and tourism industry integration using the coupling co-scheduling model. Liu Anle and Yang Chengyue (2020) [11], from the perspective of cultural and tourism industry integration, constructed a comprehensive evaluation index system of cultural and tourism industry in three aspects, which are resource base, human cost, and industrial effect, calculated the average value of cultural industry development in 31 provinces in China, and drew a conclusion that China's cultural industry experienced three stages of development, which rises, declines, and then rises slowly. Wang Naiju (2020) [12], based on theoretical basis and practical experience, analyzed the concept and dimension of the integration of culture and tourism industry, sorted out the concept of the integration of culture and tourism industry from the multi-dimensions of economy and public welfare, and divided the spatial structure of the integration of

culture and tourism industry into three dimensions, so as to break through the traditional method of measuring the separation of culture and tourism.

Based on the analysis process and method of the construction of the index system and the analysis of the empirical research results, this paper selects the indicators that scholars generally consider to be scientific and reasonable, and incorporates them into the construction of the evaluation index system of the development level of Guangxi's culture and tourism industry, and finally forms three first-level indicators based on economic indicators, supply indicators, and employment indicators. The evaluation index system of cultural and tourism industry development has 18 secondary indicators. Based on these indicators, the correlation analysis of the coupling and coordination degree of culture and tourism industry is conducted via the Stata16.0, providing data support for the qualitative analysis and judgment of the integrated development of cultural and tourism industry in Guangxi from a quantitative perspective.

3 Research and Design of Integrated Development of Cultural Tourism Industry

This paper mainly adopts the method of combining qualitative and quantitative research. First, it analyzes the current situation of Guangxi's cultural industry and tourism industry. On this basis, it measures and analyzes the development of cultural and tourism industry integration. And further discussion on the issue of measuring the level of industrial integration follows.

3.1 Research Methods

The empirical analysis is based on the statistical data of Guangxi's cultural tourism industry from 2010 to 2020.

First, use entropy method to measure the weight of each index in the evaluation index system of the integrated development of Guangxi's cultural and tourism industries, analyze the evaluation index of the development level of Guangxi's cultural and tourism industries, and then analyze the development trend and level of Guangxi's cultural and tourism industries.

The development level evaluation index of cultural industry and tourism industry is used to evaluate the development level of cultural industry and tourism industry. The formula is as follows:

$$Tourism(x) = \sum_{jn=1}^{n} wjpij, (i = 1, 2, 3...m; j = 1, 2, 3...n) \tag{1}$$

$$Culture(y) = \sum_{j=1}^{n} wjpij \tag{2}$$

where: Tourism (x) is the evaluation index of tourism industry development level;
 Culture (y) is the evaluation index of cultural industry development level;
 W_j is the weight of the jth index of tourism or cultural industry;

P_{ij} is the standardized value of the ith index of tourism industry or cultural industry;

Secondly, the coupling co-scheduling of the development of cultural tourism industry integration in Guangxi is measured. This indicator can be used to measure the evolution process and change trend of the development level of cultural tourism industry integration. This paper adopts the widely used physics coupling model.

The original coupling model formula of physics is as follows:

$$Cn = \{(U1 \cdot U2, \cdots, Un)/\left[\prod(Ui + Uj)\right]\}^{1/n} \tag{3}$$

In this paper, there are two subsystems of cultural industry and tourism industry. The coupling model formula of cultural tourism industry is as follows:

$$C = \sqrt{\frac{Tourism(x) \cdot Culture(y)}{\left[Tourism(x) + Culture(y)\right]^2}} \tag{4}$$

where: C is the coupling degree of cultural industry and tourism industry, and the value of C is between (0,1);

The coupling coordination degree model is used to measure the level and coordination of the integrated development of each subsystem in the composite system, and to evaluate the level of the integrated development of the cultural industry and the tourism industry. The formula is as follows:

$$T = \alpha Tourism(x) + bCulture(y) \tag{5}$$

$$D = \sqrt{C \cdot T} \tag{6}$$

where: T is the comprehensive coordination index of cultural industry and tourism industry;

D is the coupling and co-scheduling of cultural industry and tourism industry;

C is the coupling degree of cultural industry and tourism industry;

Thirdly, according to the grey coordination degree model, this paper analyzes the two subsystems of cultural tourism in the integration of culture and tourism in Guangxi, the contribution level of each index to the coupling degree and the grey correlation degree. Results shows the main and secondary impact indicators that affect the coupling coordination degree of culture and tourism industry.

Standardized treatment, ξ When i is a positive indicator, use (7); When it is a negative indicator, use (8)

$$\beta_i = \frac{\xi_i - \min \xi_i}{\max \xi_i - \min \xi_i} \tag{7}$$

$$\beta_i = \frac{\max \xi_i - \xi_i}{\max \xi_i - \min \xi_i} \tag{8}$$

where: β_i is the normalized value of reference sequence O and comparison sequence XY

The correlation coefficients of the system indicators corresponding to the reference series O and the comparison series X and Y are calculated based on the following formula:

$$\eta_{i1} = \frac{\min_i \min_i |O_0(t) - X_i(t)| + \kappa \max_i \max_i |O_0(t) - X_i(t)|}{|O_0(t) - X_i(t)| + \kappa \max_i \max_i |O_0(t) - X_i(t)|} \tag{9}$$

$$\eta_{i2} = \frac{\min_i \min_i |O_0(t) - X_i(t)| + \kappa \max_i \max_i |O_0(t) - Y_i(t)|}{|O_0(t) - X_i(t)| + \kappa \max_i \max_i |O_0(t) - X_i(t)|} \tag{10}$$

where: η_{i1} is the correlation coefficient between reference sequence O and comparison sequence X;

η_{i2} is the correlation coefficient between the reference sequence O and the comparison sequence Y;

The main and secondary impact indicators can be analyzed by calculating the grey correlation degree, and the formula is as follows:

$$\lambda_{i1} = \frac{1}{n} \sum_i^n \eta_{i1} \tag{11}$$

$$\lambda_{i2} = \frac{1}{n} \sum_i^n \eta_{i2} \tag{12}$$

where: λ_{i1} is the grey correlation degree between reference sequence O and comparison sequence X;

λ_{i2} is the grey correlation degree between reference sequence O and comparison sequence Y;

The above research and analysis process carries out empirical analysis on the development level of cultural tourism industry integration in Guangxi, and provides quantitative support for improving the development strategy of cultural tourism industry integration in Guangxi.

3.2 Selection of Indicators for Integrated Development of Cultural Tourism Industry

The effectiveness of the measurement results of the integration degree of cultural tourism industry partially relies on indicator selection and the indicator system construction. Zhang Xin You (2019) [13], selected industrial strength, industrial relevance, industrial resources and innovation as the four dimensions to measure the development level of Xinjiang's local cultural industry. Tian Yuan (2021) [14], constructs the evaluation index system of cultural tourism industry integration in Shandong Province from industrial efficiency and industrial support. Xu Fei, Li Bin (2021) [15], from the four dimensions of facility guarantee, service guarantee, capital guarantee or talent guarantee, and market situation, build the development evaluation index system of Liaoning's cultural industry and tourism industry.

Table 1. Cultural Industry Evaluation Index System

Industry	First-level indicators	Secondary indicators	Company
Culture industry	Economic indicators	Investment in fixed assets of culture and related industries (C1)	RMB100mn
		Proportion of cultural industry investment in the total investment of the province (C2)	%
		Number of libraries (C3)	individual
		Number of museums (C4)	individual
	Supply system	Number of artistic performance organizations (C5)	individual
		Domestic performances of art performance groups (C6)	10000 sessions
		Number of cultural relics (C7)	10000 pieces
	number of people engaged	Number of library employees (C8)	people
		Number of museum employees (C9)	people

According to the analysis process and method of the construction of the index system of reference documents, 18 indicators related to the culture and tourism industry are selected from the three dimensions of economic indicators, supply system and the number of employees, and the weights are calculated. Finally, the index system of the integrated development of the culture and tourism industry in Guangxi is constructed. The specific results are shown in Table 1 and Table 2.

Firstly, the original data of Guangxi's cultural industry and tourism industry from 2010 to 2020 are standardized, and then the weight of Guangxi's cultural industry and tourism industry development level indicators is measured according to the relevant calculation formula 1 and formula 2 of entropy method and STATA software. The specific results are shown in Table 3, Table 4, Table 5 and Table 6.

3.3 Data Source Description

To ensure the reliability of the research results, this paper selects the relevant data of Guangxi's cultural and tourism industries from 2010 to 2020. The data come from the Statistical Yearbook of Chinese Cultural Relics and Tourism, the Statistical Yearbook of Chinese Cities and the Statistical Yearbook of Guangxi. The source of panel data is authentic to ensure the rigorous and effective analysis results.

Table 2. Tourism Industry Evaluation Index System

Industry	First-level indicators	Secondary indicators	Company
Tourist industry	Economic indicators	Total number of tourists (T1)	ten thousand people
		Total tourism income (T2)	RMB100mn
		Proportion of tourism income in GDP (T3)	%
		Number of star hotels (T4)	individual
	Supply system	Number of travel agencies (Ts)	individual
		Number of A-level scenic spots (T6)	individual
		Star hotel employees (T7)	people
	number of people engaged	Travel agency employees (T8)	people
		Class A scenic spot practitioners (T9)	people

Table 3. Weights of Various Indicators of Guangxi's Cultural Industry

Secondary indicators	Information entropy e	Information utility value d	Weight coefficient W
C1	0.9078	0.0922	11.31%
C2	0.9166	0.0834	10.23%
C3	0.9199	0.0801	9.82%
C4	0.9277	0.0723	8.87%
C5	0.9024	0.0976	11.97%
C6	0.9115	0.0885	10.86%
C7	0.9025	0.0975	11.96%
C8	0.8690	0.1310	16.06%
C9	0.9272	0.0728	8.93%

Table 4. Weights of Various Indicators of Guangxi's Cultural Industry

Industry	First-level indicators	Secondary indicators	Weight
Culture industry	Economic indicators	Investment in fixed assets of culture and related industries (C1)	11.31%
		Proportion of cultural industry investment in the total investment of the province (C2)	10.23%
		Number of libraries (C3)	9.82%
		Number of museums (C4)	8.87%
	Supply system	Number of artistic performance organizations (C5)	11.97%
		Domestic performances of art performance groups (C6)	10.86%
		Number of cultural relics (C7)	11.96%
	number of people engaged	Number of library employees (C8)	16.06%
		Number of museum employees (C9)	8.93%

Table 5. Weights of Various Indicators of Guangxi's Tourism Industry

Secondary indicators	Information entropy e	Information utility value d	Weight coefficient W
T1	0.8952	0.1048	7.38%
T2	0.8272	0.1728	12.17%
T3	0.8115	0.1885	13.21
T4	0.9347	0.0653	46.01
T5	0.8411	0.1589	11.18%
T6	0.8407	0.1593	11.21%
T7	0.7597	0.2403	16.92%
T8	0.9003	0.0997	7.01%
T9	0.7694	0.2306	16.24%

Table 6. Weights of Various Indicators of Guangxi's Tourism Industry

Industry	First-level indicators	Secondary indicators	Weight
Tourist industry	Economic indicators	Total number of tourists (T1)	7.38%
		Total tourism income (T2)	12.17%
		Proportion of tourism income in GDP (T3)	13.21
		Number of star hotels (T4)	46.01
	Supply system	Number of travel agencies (Ts)	11.18%
		Number of A-level scenic spots (T6)	11.21%
		Star hotel employees (T7)	16.92%
	number of people engaged	Travel agency employees (T8)	7.01%
		Class A scenic spot practitioners (T9)	16.24%

4 Result Analysis of Panel Data of Guangxi Cultural Tourism Industry

4.1 Measurement Results and Analysis of the Development Level of Cultural Tourism Industry in Guangxi

According to the measurement formula of the development level of cultural industry and tourism industry, the evaluation index of the development level of Guangxi's cultural and tourism industry from 2010 to 2020 is calculated, and then the synchronization of the integrated development of Guangxi's cultural and tourism industry is obtained. The specific results are shown in Table 7 and Fig. 1.

The above analysis results show that the evaluation index of the development of Guangxi's cultural industry shows a gradual upward trend from 2010 to 2019, and will significantly fall back in 2020 due to the impact of the COVID-19. The development evaluation index of the cultural industry reached a phased peak in 2015, and then showed a sustained growth trend after falling, reaching the peak in 2019. It also fell significantly in 2020 due to the impact of the epidemic. Comparing the development level of culture and tourism, it can be seen that from 2010 to 2015, the development level of Guangxi's cultural industry was higher than that of the tourism industry. During this period, the synchronicity of the cultural and tourism industry was tourism lag. From 2016 to 2017, the development trend of Guangxi's cultural and tourism industry briefly reached a synchronous state, and the cultural lag began to appear in 2018.

4.2 Calculation Results and Analysis of the Coordination Degree of Cultural Tourism Industry Coupling in Guangxi

The C value of the coupling degree is between 0 and 1. The higher the C value is, the higher the correlation degree between the cultural industry and the tourism industry is. Low C value indicates a low correlation. According to the calculation formula4 in the

Table 7. Evaluation Results of the Development Level of Guangxi's Culture tourism Industry

| particular year	Tourism (x)	Culture (y)	Synchronization of cultural and tourism industry development
2010	0.062666	0.097260	Tourism lag
2011	0.090601	0.114541	Culture and tourism synchronization
2012	0.159139	0.187377	Tourism lag
2013	0.160562	0.181365	Tourism lag
2014	0.239826	0.251595	Tourism lag
2015	0.323016	0.404413	Tourism lag
2016	0.335643	0.338632	Culture and tourism synchronization
2017	0.437208	0.424437	Culture and tourism synchronization
2018	0.611293	0.583069	Cultural lag
2019	0.905559	0.806528	Cultural lag
2020	0.620644	0.506373	Cultural lag
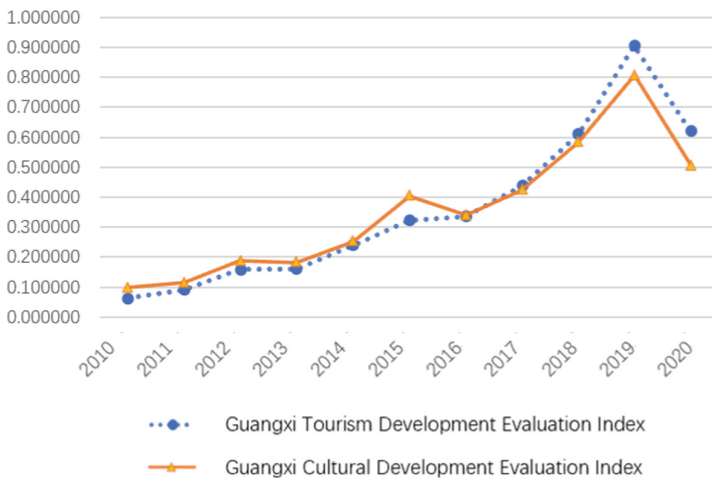
Fig. 1. 2010–2020 The Evaluation of Cultural and Tourism Industry in Guangxi

coupling degree model, the coupling index value of Guangxi's cultural industry and the tourism industry from 2010 to 2020 is calculated. The specific results are shown in Table 8 and Fig. 2.

The analysis results show that between 2010 and 2020, the coupling degree of Guangxi's cultural industry and tourism industry is between 0.4 and 0.5, which indicates that Guangxi's cultural industry and tourism industry are in a medium level coupling state during the decade. This result is basically consistent with the actual situation of

Table 8. Results of the Coupling Degree between Culture tourism Industry in Guangxi

particular year	Tourism (x)	Culture (y)	Coupling degree C
2010	0.062666	0.09726	0.488162085
2011	0.090601	0.114541	0.496583626
2012	0.159139	0.187377	0.498337031
2013	0.160562	0.181365	0.499073751
2014	0.239826	0.251595	0.499856592
2015	0.323016	0.404413	0.496859915
2016	0.335643	0.338632	0.499995087
2017	0.437208	0.424437	0.499945077
2018	0.611293	0.583069	0.499860374
2019	0.905559	0.806528	0.499162867
2020	0.620644	0.506373	0.497423254
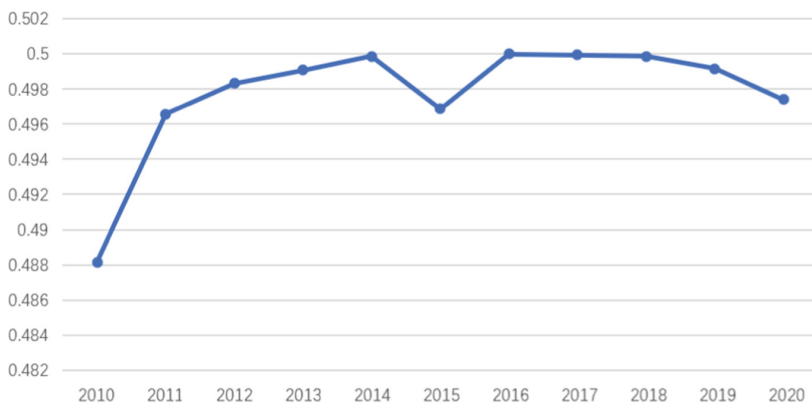
Fig. 2. The Trend of the Coupling Degree between Culture tourism Industry in Guangxi

the development of Guangxi's cultural industry and tourism industry. Guangxi's cultural industry and tourism industry need to strengthen integration and common development.

The coupling index can judge whether the development of subsystems is at the same or similar level, but it cannot effectively evaluate the level of internal development of each subsystem, nor can it explain the level and coordination of the integrated development of cultural tourism industry. Based on the analysis of the results of the integrated development level of cultural tourism industry in Guangxi from 2010 to 2020, we can see that there are drawbacks. From 2010 to 2011, the evaluation value of the development level of Guangxi's cultural industry and tourism industry was lower than 0.1, which was at a low level,

According to the data from 2016 to 2018, the coupling degree during the peak period of the three years is 0.499, but the development level of Guangxi's culture and tourism industry has obviously shown an upward trend. Therefore, the coupling degree can only measure whether the development level of the cultural industry and tourism industry is the same or similar, but it cannot reflect the internal integration of the cultural and tourism industry and the level of their respective development. It is also impossible to measure and evaluate the level and coordination of the integrated development of culture and tourism industry.

4.3   Calculation Results and Evaluation Analysis of the Coordination Degree of Cultural Tourism Industry Coupling in Guangxi

The D value represents the coupling and co-scheduling of the cultural industry and the tourism industry. A high D value means a high degree of integration between the two industries. The D value is rescaled for further analysis. Some scholars have divided the coupling coordination dispatching in the 0–1 interval into 10 levels, and the coordination levels 1 to 5 are interpreted as imbalance, namely, extreme imbalance, serious imbalance, moderate imbalance, mild imbalance and impending imbalance, and the levels 6 to 10 are interpreted as coordination, namely, grudging coordination, primary coordination, intermediate coordination, good coordination, and high-quality coordination. Based on the research of relevant scholars, the classification criteria of coupling co-dispatch levels are obtained, as shown in Table 9.

Considering that the original 10-level coordination level cannot capture the development status of industrial integration in Guangxi, this paper fine-tuned the level name on the basis of the coupling coordination level classification standard, as shown in Table 10.

Table 9. Previous Coupling and Coordination Degree Classification Standard

Coupling co-dispatch interval	Coordination level	Integrated development level
(0.0–0.1)	1	Extreme maladjustment
[0.1–0.2)	2	Serious disorder
[0.2–0.3)	3	Moderate disorder
[0.3–0.4)	4	Mild disorder
[0.4–0.5)	5	Borderline disorder
[0.5–0.6)	6	Grudging coordination
[0.6–0.7)	7	Primary coordination
[0.7–0.8)	8	Intermediate coordination
[0.8–0.9)	9	Good coordination
[0.9–1.0)	10	Quality coordination

Table 10. Coupling and Coordination Degree Classification Standard

Coupling co-dispatch interval	Coordination level	Integrated development level
(0.0–0.1)	Level 5 disorder	Extreme maladjustment
[0.1–0.2)	Level 4 disorder	Serious disorder
[0.2–0.3)	Level 3 disorder	Moderate disorder
[0.3–0.4)	Level 2 disorder	Mild disorder
[0.4–0.5)	Level 1 disorder	Borderline disorder
[0.5–0.6)	Level 1 coordination	Grudging coordination
[0.6–0.7)	Level 2 coordination	Primary coordination
[0.7–0.8)	Level 3 coordination	Intermediate coordination
[0.8–0.9)	Level 4 coordination	Good coordination
[0.9–1.0)	Level 5 coordination	Quality coordination

According to Formula 5 and Formula 6, the coupling coordination index of Guangxi cultural industry and tourism industry from 2010 to 2020 is calculated. The specific results are shown in Table 11 and Fig. 3.

The analysis results show that from 2010 to 2020 the coupling and coordination degree of Guangxi's cultural industry and tourism industry increases in general. Though the coupling and coordination degree was serious imbalanced in 2010, it reached the first level of coordination in 2018, and remained in a coordinated and stable state from 2018 to 2020. Although the level of integration and development of Guangxi's cultural and

Table 11. Guangxi Province Cultural and Tourism Industry Coupling Degree Results

| particular year	Coupling co-scheduling	Coordination level	Integrated development level
2010	0.19757253	Level 4 disorder	Serious disorder
2011	0.225688013	Level 3 disorder	Moderate disorder
2012	0.293838182	Level 3 disorder	Moderate disorder
2013	0.292101687	Level 3 disorder	Moderate disorder
2014	0.350456863	Level 2 disorder	Mild disorder
2015	0.425106052	Level 1 disorder	Borderline disorder
2016	0.410569231	Level 1 disorder	Borderline disorder
2017	0.464098683	Level 1 disorder	Borderline disorder
2018	0.546358049	Level 1 coordination	Reluctance disorder
2019	0.653685802	Level 2 coordination	Primary coordination
2020	0.529435767	Level 1 coordination	Reluctance disorder
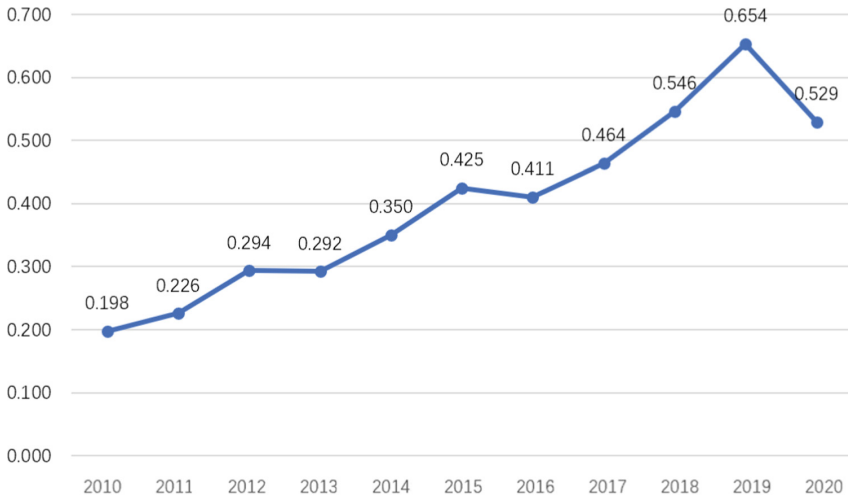
Fig. 3. The trend of the coupling and coordination of Guangxi's culture and tourism industry from 2010 to 2020

tourism industry is not high, it is in a coordinated development trend. The development of the cultural industry and the tourism industry has also increased, which is consistent with the actual situation.

Based on the development status of cultural tourism industry integration in Guangxi from 2010 to 2020, the level of cultural tourism industry integration development is roughly divided into three stages.

The first stage is the initial stage. From 2010 to 2013, the coordination degree of cultural and tourism industry integration in Guangxi was between 0.2 and 0.3. During this period, the development of cultural and tourism industry integration in Guangxi was in the initial stage, and the level of integration and development of the two was not high. The coordination level of cultural and tourism industry coupling showed that during this period, from serious imbalance to moderate imbalance, the overall level was in the period of moderate imbalance.

The second stage is the development stage. From 2014 to 2017, the coordination degree of cultural tourism industry coupling in Guangxi is between 0.3 and 0.5. During this period, the integration degree of cultural tourism industry was still at a low level, but it laid a good foundation for entering the integration development stage. The two began to have an impact gradually. In 2017, the integration degree of cultural tourism industry in Guangxi rose to 0.464, an increase of 159% compared with 2013. The integration development of cultural tourism industry in Guangxi changed from mild imbalance to near imbalance. The overall situation continued to improve, but it was still in the near imbalance period. This is closely related to the policy of promoting the integrated development of culture and tourism industry put forward by Guangxi during the 12th Five-Year Plan period.

The third stage is the integration stage. The time is from 2018 to 2020. The coupling and coordination degree of Guangxi's cultural and tourism industry is between 0.5 and

0.7, reaching a peak of 0.654 in 2019. Guangxi's cultural industry and tourism industry began to promote mutual prosperity. Affected by the special event of the COVID-19 in 2020, the degree of industrial integration dropped to 0.529, but it is still a level 1 coordination. As the pandemic tends to end, Guangxi should seize this critical historical period to promote the integration and development of cultural and tourism industries.

Thanks to Guangxi's natural and unique tourism resources and its high popularity at home and abroad, Guangxi's tourism industry has been greatly developed and achieved excellent results. The total income of the cultural industry and tourism industry has continued to grow steadily, and its influence at home and abroad is growing. Although the integration of the cultural and tourism industry has not reached the best state at present, the cultural industry has obviously lagged behind the development of the tourism industry. However, Guangxi is rich in cultural resources and has great potential for development. We should pay attention to the investment in cultural industry, continue to issue important guidance documents to promote cultural industry and tourism industry, continue to issue policies to promote the development of cultural industry and tourism industry, and lay a strong foundation for the integrated development of culture and tourism industry in the post-pandemic period.

4.4 Analysis of the Main Indicators of the Coupling Coordination Degree of GUAngxi's Culture and Tourism Industry

In order to calculate the main indicators that affect the coupling coordination degree of cultural and tourism industry in Guangxi, based on the calculation results, put forward more targeted measures and suggestions that are consistent with the development of Guangxi, further improve the level of cultural and tourism industry integration development in Guangxi, the grey correlation degree model is introduced to analyze the main indicators that affect the coupling coordination degree of cultural and tourism industry in Guangxi. According to the relevant steps of the grey correlation degree model, the grey correlation degree of the coupling coordination degree of the cultural tourism industry subsystem index is calculated by the formula 7–formula 12. The test results are shown in Table 12.

The analysis results show that in the evaluation index system of the development level of Guangxi's cultural industry and tourism industry, the grey correlation degree of all selected indicators is greater than 0.5, which proves that the selected indicators are scientific and reasonable and conform to the actual development law of Guangxi's cultural and tourism industry. The 18 data indicators have a positive impact on the coupling and coordination degree of the integrated development of cultural tourism industry in Guangxi.

Among them, the number of libraries in the cultural industry, the number of artistic performance organizations, the number of domestic performances of artistic performance groups, the total tourism income in the tourism industry, the number of star-rated hotels, and the number of employees in A-level scenic spots, all of which have a grey correlation degree of more than 0.9, are key indicators affecting the integrated development of Guangxi's cultural and tourism industry.

The proportion of cultural industry investment in the province's total investment, the number of museums, the number of cultural relics, the number of library employees,

Table 12. Grey correlation degree

Industry	First-level indicators	Secondary indicators	Grey correlation degree
Culture industry	Economic indicators	Investment in fixed assets of culture and related industries (C1)	0.8810
		Proportion of cultural industry investment in the total investment of the province (C2)	0.7525
		Number of libraries (C3)	0.9308
		Number of museums (C4)	0.8526
	Supply system	Number of artistic performance organizations (C5)	0.9100
		Domestic performances of art performance groups (C6)	0.9284
		Number of cultural relics (C7)	0.8392
	number of people engaged	Number of library employees (C8)	0.8888
		Number of museum employees (C9)	0.7082
		Total number of tourists (T1)	0.8371
	Economic indicators	Total tourism income (T2)	0.9127
		Proportion of tourism income in GDP (T3)	0.8600
		Number of star hotels (T4)	0.9475
Tourist industry	Supply system	Number of travel agencies (Ts)	0.8178
		Number of A-level scenic spots (T6)	0.8388
		Star hotel employees (T7)	0.8835

(*continued*)

Table 12. (*continued*)

Industry	First-level indicators	Secondary indicators	Grey correlation degree
	number of people engaged	Travel agency employees (T8)	0.8588
		Class A scenic spot practitioners (T9)	0.9459

the number of museum employees, the proportion of tourism industry's total tourism person-time, the proportion of tourism income in GDP, the number of travel agencies, the number of A-level scenic spots, the number of star hotel employees, and the number of travel agency employees. The grey correlation of these indicators is in the range of 0.7 to 0.9, which is the main indicator affecting the integrated development of culture and tourism in Guangxi.

Among the economic indicators, the proportion of tourism income to GDP, the total number of tourists, and the proportion of cultural industry investors to the total investment of the province are key indicators. We should continue to increase the investment in the cultural and tourism industry.

First, increase the proportion of cultural industry investment in the province's investment, and further attract domestic and foreign tourists to promote tourism consumption and increase tourism income. In terms of connotation, we need to attach importance to the development of the cultural industry. As a strong support for the tourism industry, we cannot treat culture and tourism industry separately. We should develop the cultural industry and tourism industry with the concept of integrated development of the cultural and tourism industry.

Second, strengthen the construction of cultural undertakings, innovate the development model of cultural industries, encourage the establishment of cultural industry investment funds, attract social funds to invest in the construction of cultural industry projects in Guangxi, and jointly improve the investment strength of cultural industries.

Third, increase the proportion of tourism revenue and the total number of tourists, actively expand the tourism market, and constantly strengthen the development of the domestic tourism market. At the same time, we should also play the important role of the bridgehead of Guangxi and ASEAN, increase the attraction of foreign tourism markets, and open up the domestic and foreign cultural tourism markets, attract domestic and foreign tourists with Guangxi's Bagui culture and unique landscape, and more importantly, we should improve the quality to retain tourists, and constantly expand the income of cultural tourism, Improve the coordination and coordination of cultural and tourism industries in Guangxi, and promote the integrated development level of cultural and tourism industries in Guangxi.

5   Conclusion

Guangxi is rich and unique in tourism resources. It has rich and unique tourism resources, such as the world-famous Guilin landscape, Leye Tiankeng Group, etc., as well as ethnic minority scenic spots and Baise Uprising red culture tourism resources. Guangxi has unique landscape, high forest greening coverage, and is located in the subtropical zone. It is suitable for tourism all the year round. These unique cultural resources and natural resource conditions make Guangxi's tourism industry have great potential for development. Therefore, this paper makes a quantitative analysis of the influencing factors, development level, industrial integration and other aspects of the integrated development of cultural tourism industry in Guangxi, so as to provide quantitative support for the promotion of the integrated development of cultural tourism industry in Guangxi, create a cultural tourism industry with Guangxi characteristics, formulate a reasonable development policy of cultural tourism industry from the perspective of overall development, coordinate and guide the cultural and tourism resources of the whole region, and under the premise of protecting the ecological environment, Promote the coordinated development of cultural tourism industry in Guangxi, and turn green waters and green mountains into golden mountains and silver mountains.

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