Empirical Study on Coupling Coordination of Tourism Industry and Cultural Industry in Shaanxi Province

Jiayao Ma

School of Tourism and Institute of Human Geography, Xi'an International Studies University, 710128 Shaanxi, China

majiayao4818@163.com

Abstract: The integration of culture and tourism is the macro trend of the development of tourism industry and cultural industry. It is of great significance to explore the coupling development of tourism industry and cultural industry in Shaanxi Province to promote the high-quality coordinated development of the two industries in the region and improve the performance of tourism economy. Based on the existing studies on the coupling coordination between tourism industry and cultural industry, a comprehensive evaluation index system was constructed from the perspectives of production factors, practitioners, market size and economic performance, and the coupling coordination degree of tourism industry and cultural industry in Shaanxi Province from 2011 to 2019 was calculated and the coupling relationship was analyzed. The results show that: (1) overall, the comprehensive development level of tourism industry in Shaanxi Province has experienced an upward trend and then downward trend, while the comprehensive development level of cultural industry generally tends to rise steadily except for fluctuations in 2013 and 2018, and the gap between the development level of the two industries has an obvious widening trend. (2) There is a significant coupling development relationship between tourism industry and cultural industry in Shaanxi Province, but the coupling coordination degree of the two needs to be improved. On the whole, the coupling development level of tourism industry and cultural industry in Shaanxi is low and has not reached the stage of good coordination. Finally, this study provides suggestions on the coupling and coordinated development of tourism industry and cultural industry in Shaanxi Province from the three aspects of government planning, enterprise cooperation and talent training.

1. Introduction

The integrated development of tourism industry and cultural industry improves the cultural connotation and value of tourism products, further enhances and deepens the cultural function of tourism, and helps the cultural industry to further develop the mass market and promote cultural inheritance [1]. The integration of culture and tourism is not only an important transformation and upgrading of the two industries, but also an important adjustment of economic and social structure. The Ministry of Culture and Tourism was founded in 2018 to provide policy support and institutional guarantee. In 2019, the Ministry of Culture and Tourism proposed five development ideas for the integration of cultural tourism industry. However, it is clearly pointed out in the "14th Five-year Plan for Cultural and Tourism Development" that the unbalanced and inadequate development of China's cultural industry and tourism is still relatively prominent, and the supply and demand of cultural and tourism products are not fully matched, and there is a certain gap between them and the requirements of high-quality development. The nine provinces where the Yellow River basin is located are rich in cultural and tourism resources, while the seven provinces and regions in the upper and middle reaches of the Yellow River are underdeveloped regions with lagging pace of transformation and upgrading of traditional industries. Shaanxi Province is also facing a similar dilemma. In recent years, the country has called for strengthened leadership in ecological protection and high-quality development of the Yellow River basin at the macro level, and launched the Yellow River Ecological Economic Belt strategy to further promote economic development of provinces along the river. Therefore, promoting

the integrated development and transformation and upgrading of cultural industry and tourism industry in Shaanxi Province is one of the key issues to promote the realization of high-quality development of the Yellow River Basin. This study selects Shaanxi Province as the research object and analyzes the coupling relationship between the two industries by using the coupling coordination degree model, which can provide reference for the next development of the tourism industry and cultural industry, and has certain practical significance.

2. Literature Review

Foreign scholars define this concept mainly from the scope of cultural industry, believing that "cultural industry is a product or service based on culture of a civilization, nation, society, group or place" [2]. Cultural industry is a new sunrise industry integrating creative activities. According to China's national conditions, "The Classification of Culture and Related Industries (2018)" defines it as "the activities that provide cultural and entertainment products and services for the public, as well as the collection of activities related to these activities". Foreign studies have concluded that the main function of tourism industry is to provide services for travelers, which includes four major sectors: transportation, accommodation, auxiliary services and sales and distribution [3]. The domestic perception of tourism industry refers to the collection of departments or enterprises that produce or provide products and services that meet the needs of tourism consumers in the process of tourism, such as food, accommodation, travel, shopping and entertainment [4].

Culture is the soul of tourism and tourism is the carrier of culture. There is a good coupling between tourism industry and cultural industry. This unique correlation helps industrial clusters to form spatial aggregation, and gives play to economies of scale and spillover effects, providing more opportunities for the industrial value chain [5]. Foreign scholars have studied the relationship between cultural industry and tourism industry, and the initial research started from the concept, significance and influence of cultural and tourism industry integration [6]. With the integrated development of the two industries, foreign studies began to focus on the reasons, path mechanism and performance contribution of the integration of cultural industry and tourism industry [2]. In addition, some scholars put forward that the development of cultural industry will have a positive impact on tourism economy [7]. As for the correlation between tourism industry and cultural industry, domestic scholars with the academic background of economics, management and sociology have conducted qualitative and quantitative analysis. Existing research results mainly focus on analyzing the industrial coupling development trend, dynamic mechanism and influencing factors in different regions [8]. From the point of development trend, on the whole China's tourism industry coupled unbalanced development, and the coupling degree between the eastern and gap is larger which can be inferred from the country's regional development that the southeast coastal areas have experienced a rapid development of tourism and cultural industry integration while the central areas of China have many potential resources undeveloped and the west is facing a severe development dilemma [9]. The integration of tourism and cultural industry is also one of the main trends of local development. Chen proposed that the integration of culture and tourism is an important path to promote rural revitalization in southern Jiangsu Province [10]. Rao and Liu found that the coupling development of cultural and tourism industry in Shaanxi province has a good coordination degree, and the interaction between the two has reached a benign resonance [11]. Bao and Wang studied the synergy between cultural industry and tourism industry based on the theory of industrial cluster, and found that the low synergy degree of cultural and tourism industry in Gansu Province affected industrial integration [12]. Starting from the perspective of studying the coupling dynamic mechanism of regional cultural and tourism industry, Fang and Zhang believe that the spatial cross layout of tourism industry and cultural industry constitutes the coupling relationship of mutual undertaking, which promotes the dynamic adjustment of industrial elements such as technology, labor and capital and forms a new industrial value chain [13]. Wang Shanshan et al. found that the sharing of production factors between cultural industry and tourism industry can produce diversified products, thus forming a common consumption basis and promoting the integration and transformation development of the two industries [14]. Zhou proposed that the integration of culture and tourism industry is driven by the demand of culture and tourism consumption,

coordinated by institutional environment, and coordinated by technology and institutions [15]. Domestic studies have also analyzed the influencing factors of industrial coupling. Zhang and Zhu selected the panel data of provinces to analyze the differences of regional cultural and tourism coupling, and found that the dependence degree of cultural and tourism industry affects the short-term industrial coupling relationship between the east, the middle and the west, and the marginal effect between the two industries shows symmetry [16]. Wang et al. studied northwest China with the theory of industrial integration and found that low cultural attributes of tourism industry would affect the overall coupling level [7]. For the comprehensive development of multiple regions, Wang pointed out that top-level policy design promotes the gathering of market resources in the Grand Canal belt, accelerates the maturity of cultural industry and tourism industry in this region, and promotes high-quality coupled development [17]. Li proposed that promoting the development of core urban agglomeration to strengthen the radiation-driven effect is one of the important measures to promote the development of cultural industry and coupling industry in the Yellow River Basin [1].

To sum up, cultural industry and tourism industry overlap in production factors, so they can jointly produce diversified high-value products. Therefore, these two sunrise industries have natural coupling relationship. Cultural industry and tourism industry are interdependent, the strength of cultural attributes of tourism industry and the dominance of tourism characteristics of cultural industry will affect the overall coupling development of the two industries. At present, most of the existing studies have taken the east, central and western regions, regions or single provinces as research objects, focusing on the regional differences and coupling degree of the comprehensive development level of cultural industry and tourism industry, while few studies have adopted the coupling coordination degree model of the two industries. In addition, there are few research objects and quantitative analysis in Shaanxi Province. Therefore, Shaanxi Province is selected as the research object in this study, and the coupling coordination degree model of dual-industry is used to measure the coupling coordination degree of tourism industry and cultural industry in Shaanxi Province from 2011 to 2019, and the coupling relationship is analyzed, which has certain research significance [18].

3. Materials and methods

3.1 Study area

Shaanxi Province is located in north China, on the east bank of the middle reaches of the Yellow River. It is one of the birthplaces of Chinese civilization since ancient times. Under the influence of topography, Shaanxi Province has rich natural resources and water resources, and has the reputation of "water tower in North China". Economically, in 2020, The GDP of Shaanxi Province reached 1.765.193 billion yuan, an increase of 3.6% over the previous year calculated at constant prices. The total value of the tertiary industry was 902.981 billion yuan, up 2.1%, accounting for 51.2% of the total regional GDP. Shaanxi Province has a splendid history and culture, and is one of the birthplaces of Chinese opera art. There are abundant local operas and festival customs follow historical traditions, so the folk culture is profound. In addition, Shaanxi Province also has a large number of well-preserved cultural tourism resources, with four World cultural heritage sites, among which Pingyao Ancient City, Wutai Mountain and Yungang Grottoes are well-known tourist attractions. Geographically, Shaanxi Province is located in the central area of the Yellow River Basin economic belt in China, but the provinces of the Yellow River basin, especially the middle and upper reaches of the Yellow River basin, are facing the situation of unbalanced industrial development, and there is a significant gap between them and the economically developed regions in the east. According to the Statistical Yearbook of Shaanxi Province in 2021, the total tourism income of Shaanxi is 292.008 billion yuan, the performance income of state-owned art performance groups, an important component of the cultural industry, is 121367 thousand yuan, and the income of museums and cultural relic institutions is 368.412 million yuan. According to the above data, it can be found that there are obvious differences in the development of tourism industry and cultural industry in Shaanxi Province.

3.2 Index system and data collection

According to the integration mechanism and nonlinear relationship between tourism industry and cultural industry, following the principles of scientific, relevance and representativeness of index system construction, and considering the availability of data collection, the indicators selected in this study refer to the index system of existing studies [12, 13, 15, 16]. A multi-index comprehensive evaluation system is constructed from four aspects of production factors, employees, market scale and economic performance, and 26 secondary indicators are specifically selected to construct the coupling and coordinated development of tourism industry and cultural industry in the Yellow River Basin (Table 1). The research data are mainly collected from the "China Statistical Yearbook", the "China Tourism Statistical Yearbook", the "China Cultural Relics Statistical Yearbook", the "Shaanxi Statistical Yearbook" and official statistical bulletin from 2011 to 2019.

3.3 Research methods and model construction

Coupling is originally used in physics to describe the phenomenon that the components of two or more systems are closely related and affect each other, and this degree of influence is called coupling degree. Based on relevant data and literature, this study found that coupling degree can be used to explain and analyze the close connection degree between interconnected and related industries in the field of economics, and has a strong explanatory power to describe the interaction mechanism between different industries [19-21]. The integration of tourism and cultural industry is realized by complementing and extending the two industries in aspects of production factors, talents and technology, market demand and operation mechanism, and finally forming a new industrial format and product form that is cultural tourism [9]. The integration mechanism of these two industries fits the coupling principle in essence. Therefore, this study adopts the coupling principle to quantitatively analyze the coupling coordination degree of tourism industry and cultural industry in the Yellow River Basin. In order to scientifically and accurately measure the coupling and coordinated development degree of tourism industry and cultural industry in the research area, the entropy weight method is used to measure the comprehensive evaluation index index and the coupling and coordination model is used to further quantitatively analyze the research data.

3.3.1 Evaluation of the indicators' weight

In this study, the entropy weight method is used to determine the weight of each objective index. Specific operations are as follows:

Firstly, due to the dimensional difference of each indicator, raw data (2011-2019) need to be standardized by using formulas (1) and (2) to obtain a positive index before calculating the coupling coordination degree, referring to relevant literature [21-23]:

$$x'_{ij} = \frac{x_{ij} - x_{j\min}}{x_{j\max} - x_{j\min}} \tag{1}$$

$$x'_{ij} = \frac{x_{ij} - x_{j\min}}{x_{j\max} - x_{j\min}} + 0.01 \tag{2}$$

Where x'_{ij} and x_{ij} represent the standardized value and the original value of index j in year i, respectively; And $x_{j\min}$ and $x_{j\max}$ represent the minimum value and maximum value of the index j among all years respectively.

Secondly, calculate the index weight. In this study, the information entropy weight (IEW) is adopted to calculate the index weight, referring to relevant literature [1, 7, 24], and the steps are as follows:

Calculating the proportion of the index j in year i (S_{ij})

$$S_{ij} = \frac{x'_{ij}}{\sum\limits_{i=1}^{m} x'_{ij}} \qquad (3)$$

Calculating the information entropy of the index $j(H_j)$:

$$H_j = -\frac{1}{\ln m} \sum_{i=1}^{m} \left(S_{ij} \times \ln S_{ij} \right) \qquad (4)$$

Calculating the entropy redundancy (α_j):

$$\alpha_j = 1 - H_j \qquad (5)$$

Weight of each indicator $j(\omega_j)$:

$$\omega_j = \frac{\alpha_j}{\sum\limits_{j=1}^{n} \alpha_j} \qquad (6)$$

Where m is the number of years and n is the number of indicators in a subsystem.

Table.1. Index system used for evaluation of the relationship between tourism and culture

Subsystem	First-class index	Second - class index	Index weight
Tourism industry system	Production factors	Total number of tourist attractions	0.0837
		Total number of travel agencies	0.0925
		Total number of star-rated hotels	0.0829
		Number of corporate body in accommodation industry	0.0308
		Number of corporate body in catering industry	0.0380
	Practitioners	Total number of employees in tourist attractions	
		Total number of travel agency employees	0.0658
		Total number of employees in star-rated hotels	0.0336
		Total number of persons employed in the accommodation industry	0.0579
		Total number of people employed in the catering industry	0.1024
			0.0910
	Market size	Number of domestic tourists	0.0607
		Number of inbound tourists	0.1141
	Economic performance	Total tourism revenue	0.0594
		Foreign exchange income from tourism	0.0872
Cultural industry system	Production factors	Number of cultural and related industrial institutions	0.0296
		Number of art performance venues	0.0807
		Number of museums	0.0929
		Number of public libraries	0.1506
	Practitioners	Number of persons employed in cultural undertakings	0.0367
		Number of employees of performing arts groups	0.0775
		Number of museum employees	0.0863
		Number of people employed in public libraries	0.1096
	Market size	Museum visits	0.0801
		Audience size of domestic performances by performing arts groups	0.0889
	Economic performance	Cultural expenses	0.0773
		Income from art performances	0.0897

3.3.2 Evaluation of tourism and culture

Suppose that x_j ($x_1, x_2, ..., x_9$) represent the indexes of the tourism industry subsystem and that y_j ($y_1, y_2, ..., y_9$) represent the indexes of the cultural industry subsystem [25, 26]:

$$P_j = \sum_{j=1}^{m} \omega_j \times x'_{ij} \tag{7}$$

$$Z_j = \sum_{j=1}^{m} \beta_j \times y'_{ij} \tag{8}$$

Where, P_j and Z_j reflect integration value of tourism industry subsystem and cultural industry subsystem respectively; ω_j and β_j are the weight of each index of tourism industry subsystem and that of cultural industry subsystem respectively, which can be calculated by information entropy weight (IEW); x'_{ij} and y'_{ij} are the standardized value of x_{ij} and y_{ij} respectively, which can be calculated by formula (2) described above.

3.3.3 The coupling coordination degree model

Coupling generally means that two or more systems influence each other through interaction, and coupling degree can measure the degree of mutual influence between systems or elements [1, 26]. This study analyzes the coupling coordination degree of tourism industry and cultural industry in Shaanxi Province by referring to the coupling coordination degree model proposed by Wang and other scholars [27]. The coupling coordination degree model (CCDM) is given in the following formulas:

$$C = \sqrt{\frac{P_j Z_j}{\left(P_j + \frac{Z_j}{2}\right)^2}} = \frac{2\sqrt{P_j Z_j}}{P_j + Z_j} \tag{9}$$

$$T = \alpha P_j + \beta Z_j \tag{10}$$

$$D = \sqrt{C \times T} \tag{11}$$

Where, C represents the degree of coupling between tourism industry and cultural industry; T reflects the comprehensive evaluation of tourism and culture, which reflects the overall benefit or level of both; D represents the coupling degree of coordination [28-30], $D \in [0,1]$. In formula (10), P_j and Z_j are the tourism industry subsystem and cultural industry subsystem comprehensive assessment index; α and β represent the contributions of the tourism industry subsystem and cultural industry subsystem, and due to the tourism development is as equally important as the cultural development, so the values of α and β are equivalent, according to Weng, α=β=0.5 [9].

According to the degree of coupling coordination D, the development of coupling of tourism industry and culture industry was divided into four phases and ten levels (Table 2). Based on the comparative relationship between the comprehensive assessment index of tourism P_j and culture Z_j, the coupling and coordinated development type of tourism industry system and cultural industry system in Shaanxi Province can be divided into three different types (Table 3）.

Table.2. Grade division of coupling coordination degree between tourism industry and cultural industry in Shaanxi Province

D	Coupling phase	Development characteristics	Coupling coordination level
0.00~0.09	Start-up phase	The interaction between the two industries is not obvious and the connection is not close	extreme imbalance
0.10~0.19			serious imbalance
0.20~0.29			moderate imbalance
0.30~0.39			mild imbalance
0.40~0.49	Growth stage	The interaction between the two industries began to increase and began to develop in an orderly manner	on the verge of imbalance
0.50~0.59			barely coordination
0.60~0.69	Stable phase	The two industries promote each other and develop healthily	primary coordination
0.70~0.79			intermediate

| 0.80~0.89 | Mature stage | The two industries are interdependent and closely linked | coordinate
good coordination |
| 0.90~1.00 | | | superior coordination |

Table.3. Coupling and coordinated development types of tourism industry and cultural industry in Shaanxi Province

P_j vs Z_j	Coupling coordinated development types
$P_j < Z_j$	Tourism industry lags behind
$P_j = Z_j$	Tourism and cultural industries grow simultaneously
$P_j > Z_j$	Cultural industry lags behind

4. Data processing and results

4.1 Data processing and calculation

According to formula (6) and (7), the comprehensive development index of tourism industry and cultural industry in Shaanxi Province from 2011 to 2019 is calculated, and the coupling degree and coupling coordination degree of tourism industry and cultural industry in Shaanxi Province from 2011 to 2019 are calculated according to Formula (8), (9) and (10). Based on the calculation results and the classification of coupling coordination degree and coupling coordination development type in the previous section, the coupling process phases, coupling coordination levels and coupling types of the two industrial systems in Shaanxi Province are identified, as shown in Table 4.

Table.4. Evaluation of coupling coordination degree of tourism industry and cultural industry in Shaanxi Province from 2011 to 2019

time	P_j	Z_j	T	C	D	P_j vs Z_j	Coupling phase	Coupling coordination level	Coupling coordinated development types
2011	0.4903	0.1516	0.3209	0.8494	0.5221	$P_j > Z_j$	Growth stage	barely coordination	Cultural industry lags behind
2012	0.5799	0.2896	0.4347	0.9426	0.6401	$P_j > Z_j$	Stable phase	primary coordination	Cultural industry lags behind
2013	0.5574	0.1637	0.3606	0.8378	0.5496	$P_j > Z_j$	Growth stage	barely coordination	Cultural industry lags behind
2014	0.2795	0.2603	0.2699	0.9994	0.5193	$P_j > Z_j$	Growth stage	barely coordination	Cultural industry lags behind
2015	0.2127	0.3394	0.2760	0.9733	0.5183	$P_j < Z_j$	Growth stage	barely coordination	Tourism industry lags behind
2016	0.2107	0.5336	0.3722	0.9010	0.5791	$P_j < Z_j$	Growth stage	barely coordination	Tourism industry lags behind
2017	0.2261	0.8542	0.5402	0.8136	0.6629	$P_j < Z_j$	Stable phase	primary coordination	Tourism industry lags behind
2018	0.3719	0.7560	0.5639	0.9402	0.7282	$P_j < Z_j$	Stable phas	intermediate coordinate	Tourism industry lags behind
2019	0.4537	0.8603	0.6570	0.9509	0.7904	$P_j < Z_j$	Stable phas	intermediate coordinate	Tourism industry lags behind

4.2 Results analysis

4.2.1 Analysis of comprehensive development trend

The tourism industry of Shaanxi Province has experienced an upward trend and then downward trend, while the development level of cultural industry tends to rise steadily. According to the relationship of comprehensive assessment index of tourism P_j and culture Z_j in Table 4, the comprehensive development level trend of Shaanxi's tourism industry and cultural industry from 2011 to 2019 can be observed, as shown in Figure 1.
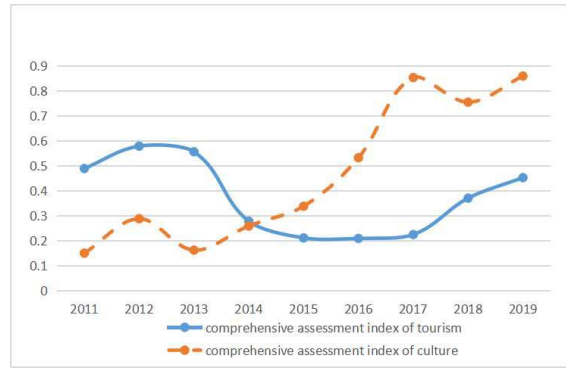
Figure 1. Overall development trend of tourism industry and cultural industry in Shaanxi Province from 2011 to 2019

On the whole, the development of tourism industry and cultural industry in Shaanxi Province experienced synchronous rise and decline from 2011 to 2013. The comprehensive development level of cultural industry showed a continuous upward trend from 2013 to 2017, but the comprehensive development level of tourism industry showed a downward trend from 2013 to 2016. It gradually recovered its upward trend from 2017, and the average development speed of cultural industry in Shaanxi Province was higher than that of tourism industry from 2014. Among them, the value of Z_j of Shaanxi's cultural industry increased from 0.1515 in 2011 to 0.8603 in 2017, with an annual growth rate of 24.23%, indicating that Shaanxi's cultural industry is developing rapidly, which means the advantages of characteristic regional cultural connotation are gradually highlighted and the comprehensive benefits of the development of Shaanxi's cultural industry are prominent. At the same time, the tourism industry value of P_j of Shaanxi Province peaked at 0.5799 in 2012, and this index fluctuated after 2013, but it never broke through 0.5, indicating that the tourism industry in Shaanxi has a low level of development, slow or even declining industrial development, and weak contribution to regional economic development.

The development of tourism industry and culture industry in Shaanxi is not balanced. According to Table 4 and Figure 1, from 2011 to 2014, the P_j was larger than the Z_j, indicating that the development level of the tourism industry in Shaanxi was ahead of the cultural industry, and the development of the tourism industry promoted the development of the local cultural industry. From 2014 to 2019, the P_j is smaller than the Z_j, indicating that the development level of the tourism industry in Shaanxi lags behind the cultural industry, and the cultural industry plays a dominant role in the coupling development process of the two industries. It can be seen from Table 4 that the sum of the series of P_j from 2011 to 2019 is 3.3822, and the sum of the series of Z_j is 4.2087, indicating that the cultural industry in Shaanxi develops better than the tourism industry on the whole, indicating that the promotion effect of cultural industry on the tourism industry is insufficient. Many local characteristic cultural resources and industrial achievements have not been well developed and utilized by tourism, resulting in the insufficient excavation of cultural connotation of tourism products in Shaanxi Province. The integration of local tourism culture and folk culture is not deep, and the interaction and support between the two industries need to be strengthened.

4.2.2 Analysis of coupling coordination relationship between subsystems

According to the coupling coordination degree in Table 4, the development trend chart of coupling coordination degree of tourism industry and cultural industry in Shaanxi Province from 2011 to 2019 can be drawn, as shown in Figure 2. It can be seen from Figure 2 and Table 4 that from 2011 to 2019, the coupling coordination degree of tourism industry and cultural industry in Shaanxi Province rose first, then declined and then continued to rise, with an annual growth rate of 5.32%. In the past nine years, the coupling development process of the two industries in Shaanxi Province has experienced two stages of growth and stability. Its evolution state shows three forms of reluctant coordination and then primary coordination and intermediate coordination, and the coupling type gradually changes

from the lagging type of cultural industry to the lagging type of tourism industry.
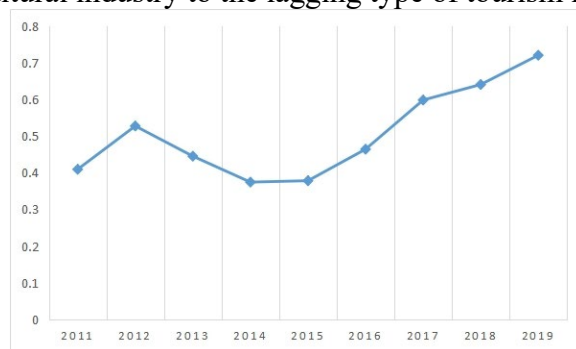

Figure 2. Coupling coordination degree of tourism industry and cultural industry in Shaanxi Province from 2011 to 2019

First, phase characteristics of coupling coordinated development. In 2011, the coupling and coordinated development of tourism industry and cultural industry in Shaanxi Province is in a growing stage, and the development level of tourism industry is ahead of the cultural industry. Although the coupling and coordination degree of the two industries is not high, the interaction between them is increasing and begins to trend to orderly development. By 2012, the overall level of the two industries was slowly improving, but the cultural industry still lagged behind the tourism industry. In 2012, the coupling development of tourism industry and cultural industry in Shaanxi was in a stable stage, and the two industries supported each other and their coordination effect was continuously enhanced. However, from 2012 to 2019, the coupling development of tourism industry and cultural industry in Shaanxi appeared as a positive "U" shaped evolution process. In 2012, China proposed a macroeconomic regulation policy to reduce economic growth expectations, guide the economy to accelerate the transformation of the development mode and effectively improve the quality and efficiency of economic development. In addition, the central government formulated eight regulations on improving government work style. As a result, the cultural and entertainment venues and performance venues, which mainly relied on government official consumption to survive and develop before 2012, had serious overcapacity, which had a certain impact on the coupling and coordinated development of tourism industry and cultural industry in Shaanxi Province. From 2013 to 2016, the coupling development of the two industrial systems is in the growth stage. Since 2012, the coupling development of tourism industry and cultural industry in Shaanxi Province has experienced a downward trend for two years, and gradually stabilized in 2014, but the interaction is not strong, and the synergistic effect is still in a weak stage. Since then, with the implementation of local cultural and tourism integration policies, the synergistic effect of the two systems has been continuously enhanced, and the coupling coordination degree has continued to rise. However, it should also be noted that until 2019, the value of coupling coordination degree of the two systems in Shaanxi Province is 0.7904, only reaching the intermediate level of coordination. More efforts are needed to realize the sustainable and benign interaction development of the two systems.

Secondly, coupling coordination level evaluation. It can be seen from Table 4 that the coupling evolution of tourism industry and tourism industry in Shaanxi Province in 2011 is barely coordinated, indicating that the development level of the two industries is not high. In 2012, the coupling evolution of the two industries in Shaanxi Province belongs to the primary coordination type, reflecting that the development of the cultural industry, which has been lagging behind, is gradually changing to an efficient way, and the comprehensive strength of the tourism industry and cultural industry is gradually increasing. From 2013 to 2016, the coupling development level of cultural industry and tourism industry in Shaanxi Province fell back to barely coordinated type again, indicating that there are still problems in the industrial structure and integrated development of the two industries, hindering the joint upgrading of the two industries. In the later stage, although the two industries are barely coordinated, the coupling coordination degree increases, indicating that the two industries have gradually solved the key problems in structural optimization and promoting common development in the later stage. In 2017, the coupling coordination level of tourism industry and cultural industry in

Shaanxi Province showed primary coordination, indicating that the strength of the two industries has been significantly enhanced, the optimization of industrial structure has achieved certain results, and the overall degree of integration has gradually improved.

Thirdly, the coupling coordination degree increased first, then decreased and then increased. As can be seen from Table 4, the coupling coordination degree of tourism industry and cultural industry in Shaanxi increased from 0.5221 in 2011 to 0.7904 in 2019, with an annual growth rate of only 5.32%, indicating that the coupling coordination ability of the two industries did not increase very much. Although since 2017, entered the stage of primary coordination level and stability, but since 2014, the two big industry coupling types have been for the tourism industry lags behind, and since 2016, the gap between the development level of the two big industry trend is obvious, therefore good coordination model of coupling of two big industry development and the impeded into a mature and coupling coordination development phase, it restricts the high quality integrated development of tourism industry and cultural industry in Shaanxi Province, so that the contribution of these two important components of the tertiary industry to the provincial economy is limited.

5. Conclusions and discussions

5.1 The research conclusion

The integrated development of tourism industry and cultural industry is an important support part of the economic development of Shaanxi Province, as well as a new driving force for the transformation and upgrading of the two industries, and an important way for Shaanxi to achieve high-quality regional economic development in the Yellow River Basin. This study uses coupling coordination degree model to quantitatively analyze the comprehensive development level of tourism industry and cultural industry in Shaanxi Province from 2011 to 2019, as well as the coupling coordination development degree and stage of the two industrial systems, and evaluates the degree, stage and level respectively. The main conclusions are as follows: (1) Overall, the comprehensive development level of the tourism industry in Shaanxi Province experienced a trend of rising first and then falling, while the comprehensive development level of the cultural industry tended to rise steadily on the whole except for the fluctuations in 2013 and 2018, and the gap between the development level of the two industries widened significantly. (2) There is a significant coupling development relationship between tourism industry and cultural industry in Shaanxi Province, but the coupling coordination degree of the two needs to be improved. On the whole, the coupling development level of tourism industry and cultural industry in Shaanxi is low, and the value of coupling coordination degree is mostly below 0.6. Moreover, from 2013 to 2016, the two industries have been in the development stage of reluctant coordination for a long time. In 2019, the coupling coordination degree is at the intermediate level, which has not reached the stage of good coordination.

5.2 Suggestions

From the perspective of industrial integration, only when cultural industry and tourism industry support and penetrate each other can they form a positive correlation effect of mutual promotion and integration [13]. From the experience of tourism development at home and abroad, the higher the degree of coupling and coordination between culture and tourism, the more developed the local tourism economy will be [14]. At present, the development of tourism industry in Shaanxi Province lags behind that of cultural industry. As a result, the local related department needs on the basis of the existing cultural resources and tourism resources, from all aspects to find factors hindering the development of the two industries coupled coordination, provide accurate policy toolbox, promote the transformation and upgrading of the two industries and coordinating integration, implementation of Shaanxi Province politics, economy, culture, entertainment, and ecology of comprehensive benefit growth.

Strengthen the coordination mechanism of government planning, enhance the driving effect of cultural industry on tourism industry, and promote the integration of culture and tourism. Before planning the development of the local cultural industry and tourism industry, Shaanxi provincial

governments at all levels should fully understand the specific development process of the two local industries and the problems and root causes in each stage, and anchor the new opportunities and demands under the background of the integration of tourism and cultural industry. Relevant government departments can set up short-term, medium-term and long-term policies and measures and public institutions in accordance with the local industrial development law through the policy toolbox. For example, in the short term, economic support should be given priority. Measures such as financial support, credit support, tax incentives and rent reduction can be considered. In the medium term, to do a good job in demand management, we can consider issuing cultural and tourism consumption vouchers, launching cultural and tourism one-card, exclusive electronic cards for tourism and cultural consumption and other cultural and tourism products to benefit the people, and promoting all scenic spots and cultural institutions to implement ticket discounts and other measures; In the long run, supply-side reform should be carried out. According to the development plan and requirements of the 14th Five-Year Plan, the local government should make the policy and strategic deployment of the cultural industry and tourism industry in advance, and clarify the development direction and goals of the cultural industry and tourism industry.

We will optimize the allocation of cultural and tourism resources and promote deeper cooperation between market players in the two industries. Strengthen the concept of industrial coupling development of enterprises related to culture and tourism industry. On the one hand, encourage cultural tourism type enterprise to dig deeper into Shaanxi local characteristic cultural resources and elements of the activation of culture and innovation to create new travel products, such as local folk literature can be mining, gourmet food, festival custom, dancing, music and other resources development into creative text brigade, film and television tourism destination, food products such as blocks or variety works; On the other hand, we should innovate the marketing model of cultural tourism, build Shaanxi's iconic cultural tourism brand and enhance the influence of tourism destinations. It is also possible to realize effective reform of cultural tourism marketing within and outside the province by integrating various stakeholders to carry out joint marketing and effectively allocating resources.

We should cultivate compound talents and give full play to the talent gathering effect to promote the integrated development of the industry. The integration of cultural industry and tourism industry requires not only long-term financial support and in-depth cooperation between market players, but also a group of inter-disciplinary talents with the ability of cultural knowledge mining and development as well as the operation and management of tourism industry. Therefore, according to the talent gap of the coupling development of culture and tourism industry, Shaanxi Province can set up a new major in the direction of tourism based on the cultural industry, establish a talent training mechanism of industry-university-research integration oriented to the integration of culture and tourism industry, and cultivate capable high-end compound talents. At the same time, Shaanxi Province can also strengthen the introduction of talents, attract talents with relevant knowledge background to come to work, and give full play to the effect of talent gathering.

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