Asia Pacific Academy of Science Pte. Ltd.

Eco Cities 2024, 5(2), 2857.
https://doi.org/10.54517/ec.v5i2.2857

Article

Analytical study on the coupling coordination degree of tourism and urban development—Taking Shaanxi as an example

Lei Wen

Art Design and Culture Media Academy, Guangxi City Vocational University, Chongzuo 532100, China; wenleiwda@163.com

CITATION

Wen L. Analytical study on the coupling coordination degree of tourism and urban development—Taking Shaanxi as an example. Eco Cities. 2024; 5(2): 2857. https://doi.org/10.54517/ec.v5i2.2857

ARTICLE INFO

Received: 26 June 2024
Accepted: 2 August 2024
Available online: 15 August 2024

Abstract: Tourism has been instrumental in fostering regional economic growth, enhancing the quality of life of residents, and boosting the image of urban areas in Shaanxi, thanks to the accelerated economic and social development of recent years. Nevertheless, the issue of aligning urban development and tourism in terms of space, resources, and the industrial chain remains a significant concern. This paper establishes an evaluation index system for tourism and urban development in the Shaanxi region from 2009 to 2019. It then employs the systematic coupling coordination model to conduct a comprehensive analysis of the coupling coordination degree of tourism and urban development in the region, as well as its various influencing factors. The study demonstrates that the coupling and coordination degree of tourism and urban development in the Shaanxi region exhibited a trend of continuous improvement from 2009 to 2019. The region underwent three stages of development: "uncoordinated development (2009–2011), transformation development (2012–2016), and coordinated development (2017–2019)." The coupling coordination level was elevated from "mild dissonance" to "intermediate coordination" in 2019. In contrast, the tourism economic development of Shaanxi cities remains unequal, as evidenced by the existence of two distinct categories of development: the "lagging tourism economy" and the "coordinated tourism economy." The findings of this investigation indicate that the general trend of urban development and tourism in Shaanxi is favorable; however, the disparities in the progress of the tourism economy among cities necessitate additional regional coordination and cooperation. The theoretical support for the relevant research and a reference basis for tourism development planning and urban policy making are provided by the evaluation index system and the systematic coupling coordination model proposed in this paper. This will facilitate the sustainable and coordinated development of the tourism industry and cities in Shaanxi.

Keywords: tourism; urban development; coupled coordination; evaluation indicator system

1. Introduction

Shaanxi Province is a region with a rich cultural heritage and a profound history (**Figure 1**). It is also one of the most significant regions in China for the development of tourism. In recent years, there has been a gradual increase in the understanding of the correlation between the development of tourism and the development of cities in Shaanxi. The integration and coordination degree of tourism and urban development have not yet been thoroughly addressed, which has led to numerous issues in the practical application process [1]. Thus, the study of the degree of coordination between tourism and urban development in Shaanxi is of significant theoretical and practical importance in the pursuit of the sustainable development of tourism and the harmonious development of cities in the region [2].

This paper aims to evaluate the system coordination effect and influencing factors of tourism and urban development in Shaanxi from 2009 to 2019 by constructing an

evaluation index system of tourism and urban development and comprehensively applying the system coupling and coordination model. The specific research contents consist of the following: 1) the construction of the evaluation index system and the determination of the evaluation index weights; 2) the quantitative analysis of the coupling and coordination degree of tourism and urban development in Shaanxi through the full application of the system coupling and coordination model; and 3) the examination of the evolution characteristics and influencing factors of the coupling and coordination degree of tourism and urban development in Shaanxi.

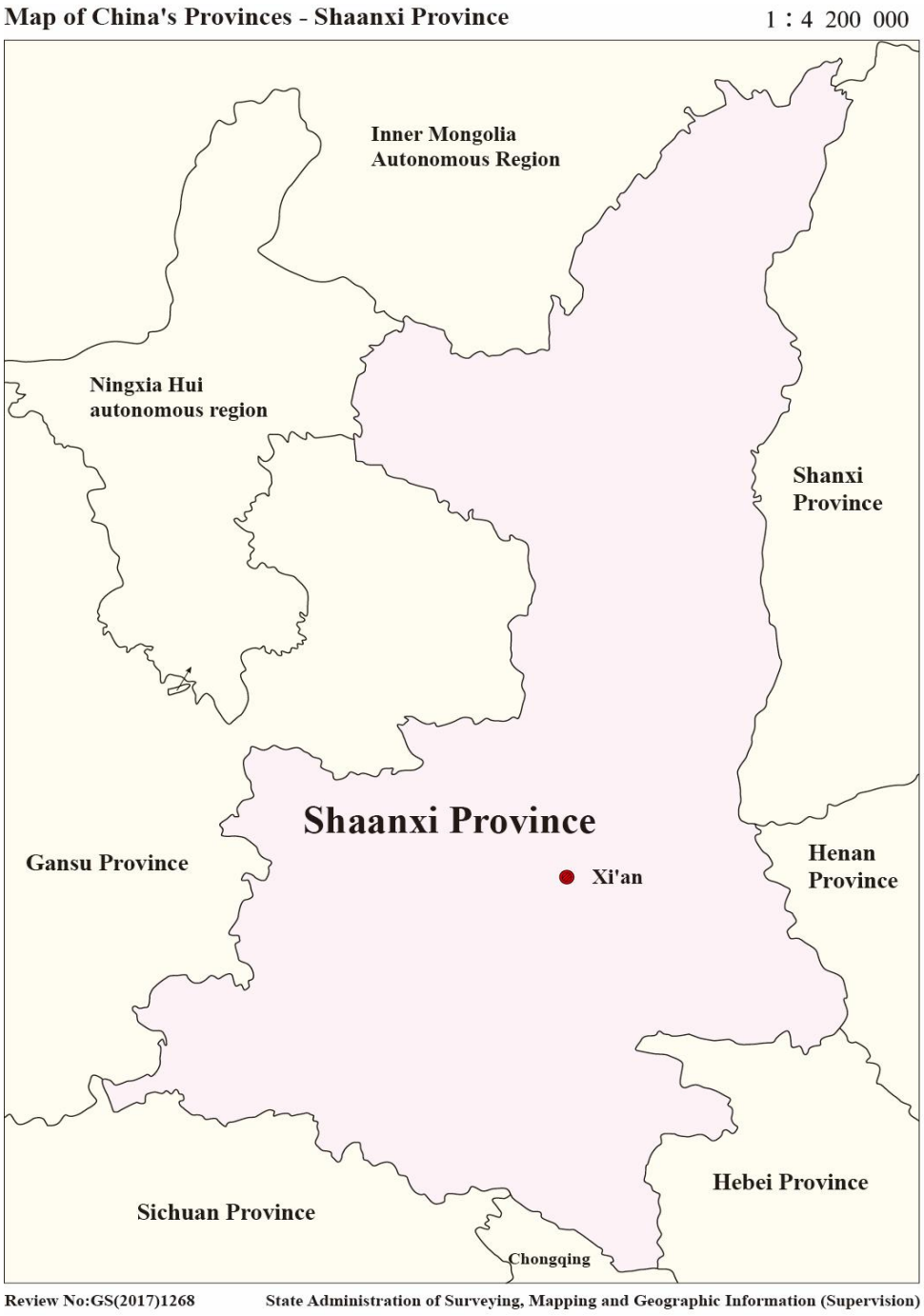

Figure 1. Regional map of Shaanxi province.

This paper's results can serve as a benchmark for the advancement of tourism

and cities in Shaanxi, and they may also have implications for the development of tourism and cities in other comparable regions. In particular, the results of this paper have the potential to offer scientific policy recommendations to government departments in order to facilitate the coordinated development of cities and tourism. Additionally, they can generate novel ideas and methodologies for related research to further the ongoing advancement of urban and tourism development.

2. Review of research

Recent years have witnessed a surge in academic discourse regarding the integration and coordination of urban development and tourism. The majority of the existing research has investigated the influence of tourism on the urban economy, society, culture, and environment, as well as the counteraction of urban development on tourism. This has resulted in the development of a relatively mature theoretical framework and research procedures.

A variety of perspectives have been advanced by researchers in relation to the interaction between urban development and tourism. For instance, there are scholars who contend that tourism advances urban economic development and facilitates cultural and social integration. Tourism has been demonstrated to facilitate urban economic development, enhance infrastructure development, and improve the image and visibility of cities in certain empirical analyses [3].

There are numerous studies in the existing literature that focus on various aspects of urban development and tourism. Researchers have investigated the interplay between industrial coupling, ecological coupling, spatial coupling, and numerous other variables. Furthermore, the beneficial effects of tourism on urban development are not limited to economic benefits; they also encompass the transformation of urban social structure and cultural identity [4].

As an illustration, Li et al. conducted a literature review to investigate the two-way interactive relationship between tourism and urban development. They emphasized the significance of tourism in fostering the urban economy and improving the social and cultural vitality of cities [5]. Furthermore, Avraham's "Spiral Development Theory" uncovers the mutually reinforcing characteristics of urban development and tourism, thereby enhancing our comprehension of the relationship between the two [6].

Scholars such as Khan have uncovered the intricate relationship between tourism and urban development through data analysis, demonstrating that tourism not only directly stimulates economic growth but also indirectly enhances urban infrastructure and attracts external resources [7]. In recent years, empirical research has become a mainstream method in this field. Furthermore, Kruger's Dynamic Competition Model underscores the dynamic nature of the relationship between tourism and urban development, positing that the interaction between the two is subject to evolutionary change [8].

Future research should prioritize the multi-dimensional coupling mechanism between tourism and urban development, investigate their interaction patterns in depth, and propose a theoretical framework that is tailored to the global urbanization process by integrating the practical experiences of various regions, according to the findings

of existing empirical research. This paper thoroughly investigates the coupling relationship between tourism and urban development by utilizing the most recent empirical analysis methods. It also suggests a novel analytical framework that meticulously evaluates the effects of tourism on various aspects of the urban economy, society, culture, and ecology. This framework offers a novel theoretical foundation for the subsequent comprehension of the dynamic interaction between the two, as well as a reference point for future research in the same field.

3. Data and methods

3.1. Data sources and indicator construction

"Tourism and urban development" is a complex system characterized by mutual influence and interconnection. At present, there is no standardized framework for the construction of an indicator system for the coupled development of the tourism economy and transportation within academic research. This paper adheres to principles of timeliness, systematicity, scientific rigor, rationality, and data availability when selecting indicators. Based on the requirements for high-quality tourism development in the new era and drawing on existing related studies, nine indicators were selected from four criteria levels to establish the "Tourism-Urban Development Evaluation Indicator System" (see **Table 1**).

Table 1. System of indicators for the assessment of the development of tourism in cities.

Subsystems	Tier 1 indicators	Secondary indicators	Unit
Tourism $T_{(y)}$	Tourism Development Indicator T_1	Tourism revenue T_{11}	Billion
		Number of tourists T_{12}	Million people
	Tourism Infrastructure Indicator T_2	Number of tourist accommodation businesses T_{21}	One company
		Restaurant business meal revenue T_{22}	Billion
Urban Development $E_{(x)}$	Urban Economic Development Indicator E_1	Gross regional product E_{11}	Billion
		Disposable income per urban resident E_{12}	Yuan
		Disposable income per rural resident E_{13}	Yuan
	Urban Infrastructure Indicator E_2	Green space in urban parks E_{21}	Million hectares
		Taxi E_{22}	Vehicle

The chosen indicators not only comprehensively reflect the development of the tourism industry, such as measuring its economic benefits and social impact through tourism revenue and visitor numbers, but also highlight key elements of tourism service capacity through tourism infrastructure, including the number of accommodation businesses and income from the catering industry. Meanwhile, the indicators for urban development are derived from two dimensions: economic development and infrastructure. These include widely applied and authoritative indicators such as regional GDP, residents' disposable income, and green space area, systematically reflecting the city's support for and impact on the tourism industry.

From two dimensions: tourism infrastructure and tourism development, four evaluation indicators were chosen for the tourism subsystem. In particular, tourism infrastructure serves as the bedrock of the tourism system, while tourism development

indicators quantify the input and output of the tourism economy. Five evaluation indicators from the dimensions of urban economic development and urban infrastructure are selected by the urban development subsystem, which is based on the 'foundation-development' system. The foundation indicators reflect the current status of urban infrastructure, while the development indicators measure the regional GDP and per capita disposable income of urban and rural residents.

The article's data is sourced from the Shaanxi Tourism Statistical Yearbook, Shaanxi Statistical Yearbook, and other government statistical departments' publications from 2009 to 2019 (**Table 2**).

Table 2. Data on tourism-urban development indicators.

Year	Tourism Development Indicators		Tourism Infrastructure Indicators	
	T11 (billion yuan)	T12 (million)	T21 (pcs)	T22 ($ billion)
2009	767	11,555	441	60.7
2010	984	14,566	504	70.6
2011	1324	18,406	537	94.8
2012	1713	23,276	605	108.1
2013	2135	28,514	684	102.3
2014	2521	33,219	718	105.6
2015	3006	38,567	745	115.7
2016	3813	44,913	798	131
2017	4814	52,284	868	150
2018	5995	63,025	948	172
2019	7212	70,714	1111	191.1

Year	Urban Economic Development Indicators			Urban Infrastructure Indicators	
	E11 (billion yuan)	E12 (RMB)	E13 (RMB)	E21 (million hectares)	E22 (vehicles)
2009	7997.8	13,836	3722	0.73	20,278
2010	9845.2	15,343	4477	0.84	21,288
2011	12,175.1	17,836	5484	0.91	22,385
2012	14,142.4	20,269	6285	0.96	22,657
2013	15,905.4	22,346	7092	1.01	22,684
2014	17,402.5	24,366	7932	1.1	23,766
2015	17,898.8	26,420	8689	1.17	24,052
2016	19,045.8	28,440	9396	1.22	24,458
2017	21,473.5	30,810	10,265	1.36	25,468
2018	23,941.9	33,319	11,213	1.41	25,543
2019	25,793.2	36,098	12,326	1.45	27,939

3.2. Data dimensionless processing model

The article employs the square normalization method to render the original data dimensionless, thereby eliminating the physical significance and dimensionality of each indicator. Equation (1) is illustrated below:

$$SSN\_z = \frac{x}{\sqrt{\sum_{i=1}^{n} x_i}} \quad (1)$$

where *SSN_z* denotes the result of the 9 secondary indicators invariant steel processing and square normalization, the purpose of which is to let the 'sum of squares' as the reference standard, all data all divided by the sum of squares; the data obtained is equivalent to the percentage of the sum of squares; its calculation formula is *X*/Sqrt (Sum (X^2)), that is, all The formula is X/Sqrt (Sum (X^2)), i.e., the 'sum of squares' of all the data is used as the unit, and all the data is removed by the 'sum of squares'.

3.3. Entropy value method for determining weights

1) Calculation of the indicator entropy e_i "Equation (2)":

$$e_i = -k \sum_{j=1}^{n} f_{ij} \ln f_{ij} \quad (2)$$

where $k = \frac{1}{\ln n}$, $f_{ij} = \frac{u_{ij}}{\sum_{j=1}^{n} u_{ij}}$, and when $f_{ij} = 0$ when $f_{ij} \ln f_{ij} = 0$.

2) Calculation of indicator weights w_i "Equation (3)":

$$w_i = \frac{1 - e_i}{m - \sum_{i=1}^{n} e_i} \quad (3)$$

3.4. System coupling and coordination model

Coupling is a physical concept that is employed to describe the degree to which two elements interact with one another. The degree of coupling is indicative of the degree of interaction between urban development and tourism, but it does not accurately quantify the synergistic effect of their combined development. In light of this, the article introduces a more scientific model of coupling and coordination, which is calculated using Equation (4) as follows:

$$D = \sqrt{C \times T} \quad (4)$$

where $C = \left[\frac{c_1 c_2}{(c_1 + c_2)^2}\right]^{1/2}$, is the coordination index; c_1, c_2 are the posting progress of the 2 subsystems, respectively; $T = \alpha c_1 + \beta c_2$, is the comprehensive evaluation index; α and β are the weights of the subsystems determined by the entropy weight method, respectively. In the formula, *D* is the coupling degree, and the value range is [0, 1], in which the closer *D* is to 1, it means that the coupling degree between the systems is bigger; the closer *D* is to 0, it means that the coupling degree between the systems is smaller, and the various sequential coefficients are in the state of irrelevant and needless to develop; α, β are the weight coefficients ($\alpha + \beta = 1$). The article studies the rank of the coordination degree and its division criteria and divides the coupling coordination degree into 10 subclasses (**Table 3**).

The basis for the classification of the D value of the coupling coordination degree in **Table 3** is mainly derived from theoretical studies and empirical analyses. The degree of coupling coordination reflects the interaction and synergistic effect between systems, and the closer the D value is to 1, the higher the coordination between systems is, and the closer it is to 0, the more it indicates that the system is in a dysfunctional state. Based on the development trend of the coupling coordination model and the results of the previous empirical research and relevant literature, the specific division

criteria ensure that the various intervals reasonably reflect the different stages from "extreme dysfunction" to "high-quality coordination", which is both scientific and applicable. It is scientific and applicable.

Table 3. Criteria for classification of coupling coordination levels.

Coupling coordination *D*-value interval	Coordination level	Degree of coupling coordination
(0.0–0.1)	1	Extreme disorders
[0.1–0.2)	2	Severe disorders
[0.2–0.3)	3	Moderate disorder
[0.3–0.4)	4	Mild disorders
[0.4–0.5)	5	On the verge of disorder
[0.5–0.6)	6	Reluctantly coordinated
[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

4. Results and analysis

4.1. Standardization of data

From the following table (**Table 4** and **Figure 2**), it can be seen that there are no outliers in the current data after the square normalization for dimensionless processing, thus the next stage of the analysis is carried out directly on the data.

Table 4. Data standardization of the underlying data.

Name	Sample size	Minimum value	Maximum value	Average	Standard deviation	Median
SSN_T11	11	0.062	0.585	0.253	0.172	0.205
SSN_T12	11	0.085	0.522	0.268	0.145	0.245
SSN_T21	11	0.178	0.447	0.291	0.081	0.289
SSN_T22	11	0.147	0.463	0.287	0.097	0.262
SSN_E11	11	0.136	0.439	0.287	0.096	0.296
SSN_E12	11	0.164	0.428	0.290	0.087	0.289
SSN_E13	11	0.135	0.446	0.286	0.101	0.287
SSN_E21	11	0.195	0.387	0.295	0.064	0.294
SSN_E22	11	0.257	0.354	0.300	0.027	0.301

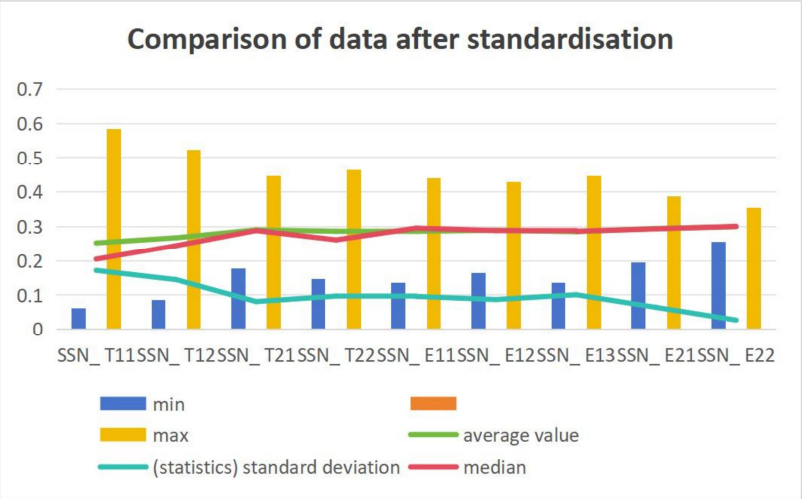

Figure 2. Comparison of data after standardization.

4.2. Entropy method data weighting

The entropy value method was employed to determine the weights of a total of 9 items, including SN_T (**Table 5**). The table demonstrates that the weights of the 9 indicators (SSN_tourism revenue, SSN_number of tourists, SSN_number of tourism accommodation enterprises, SSN_meal revenue of catering enterprises, SSN_gross regional product, SSN_per capita disposable income of urban residents, SSN_per capita disposable income of rural residents, SSN_) vary, with SSN_Tourism income having the highest weight (0.3389, 0.224, 0.0578, 0.0856, 0.0866, 0.0687, 0.0964, 0.0357, 0.0062). The weights were assignable to the coupled analysis data and determined using the entropy method.

Table 5. Summary of the results of the entropy method for calculating weights.

Item	Information entropy value *e*	Information utility value *d*	Weighting factor *w*
SSN_T11	0.9147	0.0853	33.89%
SSN_T12	0.9436	0.0564	22.40%
SSN_T21	0.9855	0.0145	5.78%
SSN_T22	0.9785	0.0215	8.56%
SSN_E11	0.9782	0.0218	8.66%
SSN_E12	0.9827	0.0173	6.87%
SSN_E13	0.9757	0.0243	9.64%
SSN_E21	0.9910	0.0090	3.57%
SSN_E22	0.9984	0.0016	0.62%

4.3. Coupling coordination analysis

4.3.1. Analysis of the evolutionary trajectory of the relevance and coherence of tourism and urban development

From 2009 to 2019, the overall trend of tourism economic development in the Shaanxi region showed continuous growth, as indicated in **Table 6**. The coupling coordination degree between tourism and urban development increased from 0.316 in 2009 to 0.709 in 2019, an increase of more than 2.5 times, suggesting significant

progress in the tourism economy and a generally positive relationship between tourism and urban development. The trend in the coupling coordination degree from 2009 to 2019 has been steadily improving. The coordination index between tourism and urban development rose from 0.108 in 2009 to a peak of 0.507 in 2019, with the coupling coordination level shifting from "slight imbalance" in 2009 to "moderate coordination" in 2019, reflecting a strengthening of the coordination effect. The overall development of the coupling coordination degree underwent several stages: "uncoordinated development (2009–2011), transitional development (2012–2016), and coordinated development (2017–2019)," with the coupling coordination level evolving from "slight imbalance" to "moderate coordination."

Table 6. Results of coupling coordination calculations.

Year	Coupling degree *C* value	Coordination index *T*-value	Coupling coordination *D*-value	Coordination level	Degree of coupling coordination	Coordination phase
2009	0.928	0.108	0.316	4	Mild disorders	Uncoordinated development
2010	0.946	0.130	0.350	4	Mild disorders	
2011	0.964	0.161	0.394	4	Mild disorders	
2012	0.979	0.192	0.434	5	On the verge of disorder	Lightweight development
2013	0.989	0.221	0.467	5	On the verge of disorder	
2014	0.993	0.248	0.497	5	On the verge of disorder	
2015	0.997	0.279	0.528	6	Reluctantly coordinated	
2016	1.000	0.323	0.568	6	Reluctantly coordinated	
2017	0.999	0.378	0.614	7	Primary coordination	Coordinated development
2018	0.994	0.444	0.664	7	Primary coordination	
2019	0.990	0.507	0.709	8	Intermediate coordination	

4.3.2. Analysis of the evolutionary stages and types of coupling coordination

The availability and authenticity of the data are the foundations of the examination of urban development and tourism during this period. The tourism economy in Shaanxi Province exhibited a general growth trajectory during this period. The coupling coordination degree between tourism and urban development increased from 0.316 to 0.709 from 2009 to 2019, more than doubling. This suggests that the tourism sector in Shaanxi has been considerably developed, with a relatively favorable overall situation for urban development and tourism.

The "Uncoordinated Development" stage (2009–2011), the "Transitional Development" stage (2012–2016), and the "Coordinated Development" stage (2017–2019) are the three stages into which the coupling coordination degree can be developed. The coupling coordination degree was at a low level, indicating some indications of imbalance, and the coordination index between tourism and urban development was relatively low during the "Uncoordinated Development" stage.

Nevertheless, Shaanxi Province progressively entered the "Transitional Development" stage as time progressed, marked by a consistent increase in the coordination index between tourism and urban development, as well as an improvement in the coupling coordination degree. The coupling coordination degree achieved a moderate level of coordination, and the coordination index hit its maximum point during the "Coordinated Development" stage. This development suggests that the relationship between urban development and tourism in Shaanxi has progressively transitioned from uncoordinated to coordinated, resulting in substantial progress. The region's economic growth is positively influenced by the enhanced interaction and coordination effect between tourism and urban development, as indicated by the improvement in the coupling coordination degree [8].

Furthermore, the change in coordination levels discussed in the paper can be used to summarize the development type of the coupling coordination degree in Shaanxi as an evolution from "mild imbalance" to "moderate coordination." This also demonstrates the direction and advancement of the relationship between urban development and tourism in the region. Moreover, this type of analysis can offer valuable references for regional governments and businesses to enhance the planning and implementation of tourism and urban development strategies, thereby attaining enhanced coordination and development [9].

In conclusion, the study's examination of the evolution phases and forms of coupling coordination degree offers a comprehensive examination of the correlation between urban development and tourism in Shaanxi. It provides significant theoretical and practical references for the planning and decision-making of urban development and tourism in the region by revealing the evolving trend and type of coupling coordination degree over time.

5. Discussion: Tourism and sustainable urban development

This study conducts an in-depth analysis of the current state of tourism and urban development in Shaanxi Province. It finds that, while the province attracts a significant number of tourists through its rich historical and cultural resources, such as the Terracotta Army and Huaqing Pool, the rapid development of the tourism industry has also revealed several issues. For instance, urban infrastructure struggles to meet the increasing demands of tourists, and the management systems have not fully adapted to the swift growth of tourism [10]. These problems hinder the coordinated development of tourism and urban areas, and therefore, effective countermeasures are urgently required.

To promote the coordinated development of Shaanxi's tourism industry and urban growth, this paper proposes the following five policy recommendations:

(1) Establish and Improve a Mechanism for Coordinated Tourism Planning and Urban Development: A cross-departmental coordination body should be established as soon as possible, specifically responsible for aligning tourism and urban development, ensuring that tourism planning and urban development strategies are synchronized and mutually supportive. Efforts should be made to enhance the implementation and supervision of tourism planning, and tourism development strategies should be revised in response to new challenges arising from urban

development, ensuring the sustainable use and effective management of tourism resources [11].

(2) Enhance the Level of Urban Infrastructure Development: Efforts should be intensified in infrastructure development, particularly in areas such as transportation, utilities, and communications, to enhance the city's capacity to accommodate tourists. For example, expanding transport networks like highways and railways would improve access to tourist attractions, while enhancing public service facilities, such as increasing the availability of car parks and public toilets, would provide a more convenient tourist experience. These measures would directly enhance the attractiveness and tourism capacity of cities [12].

(3) Promote the Deep Integration of Tourism and Cultural Industries: Shaanxi's cultural resources are its core competitive advantage in tourism development. By innovating cultural tourism products and deeply exploring local characteristics, the province should create unique experiences that integrate culture and tourism. Activities such as traditional festivals and intangible cultural heritage exhibitions can significantly boost cultural consumption among tourists and increase the added value of the tourism industry [13].

(4) Strengthen Tourism Brand Building and Promotion: Efforts should be made to build a strong tourism brand with distinctive regional characteristics, enhancing Shaanxi Province's image and reputation as a tourist destination. Special attention should be given to utilizing new media and digital platforms, employing a variety of promotional methods to precisely target potential domestic and international tourists. A strong brand promotion strategy will not only enhance market competitiveness but also boost tourist loyalty [14].

(5) Optimize Tourism Services and Management Systems: By enhancing the capacity of tourism management bodies, the professionalization and standardization of tourist site management should be promoted. Focus should be placed on improving the service quality of employees through the establishment of comprehensive training mechanisms, while also regulating the tourism market. Additionally, a robust complaint and feedback mechanism should be developed to ensure that tourists' concerns are addressed promptly and effectively, thereby improving overall tourist satisfaction [15–18].

Through the effective implementation of these policies, Shaanxi Province will be able to promote the synergistic advancement of its tourism industry and urban development, boosting overall economic vitality. This will not only improve tourists' experience and satisfaction but will also lay a solid foundation for the future development of tourism and cities in Shaanxi Province, driving healthy and sustainable regional economic growth.

6. Conclusion

The coupling degree of tourism and urban development in Shaanxi from 2009 to 2019 was rigorously examined in this study through the development of an evaluation index system and the application of a systematic coupling coordination model. The findings indicate that the tourism industry and urban development in Shaanxi Province have exhibited a consistent upward trend in coupling, and the degree of coupling

coordination has developed from the "uncoordinated development" stage to the "coordinated development" stage. Conversely, there are variations in the economic development of tourism across various cities, suggesting that the region has not yet attained a comprehensive equilibrium between urban and tourism. In order to facilitate the synergistic advancement of tourism and urban development in Shaanxi Province and to further advance the high-quality development of the regional economy, this paper proposes policy recommendations, including the enhancement of infrastructure, the integration of tourism and cultural industries, the optimization of the tourism service management system, and the reinforcement of brand building.

Conflict of interest: The author declares no conflict of interest.

References

1. Jiménez-Medina P, Artal-Tur A, Sánchez-Casado N. Tourism Business, Place Identity, Sustainable Development, and Urban Resilience: A Focus on the Sociocultural Dimension. International Regional Science Review. 2020; 44(1): 170-199. doi: 10.1177/0160017620925130
2. Elmanzlawi A. Slum Tourism as a Requirement to Ensure Sustainable Urban Development Case-Study: Cairo's Ashwa'iyat (Informal Areas). (Dept.A). MEJ Mansoura Engineering Journal. 2021; 46(2): 29-46. doi: 10.21608/bfemu.2021.169803
3. Ristianti NS, Kurniati R, Widjajanti R. The sustainability concept of Malay Kampong as tourism destination and urbanheritage in Semarang: dualism of modern transformation versus heritage. IOP Conference Series: Earth and Environmental Science. 2021; 778(1): 012011. doi: 10.1088/1755-1315/778/1/012011
4. Adrianto L, Kurniawan F, Romadhon A, et al. Assessing social-ecological system carrying capacity for urban small island tourism: The case of Tidung Islands, Jakarta Capital Province, Indonesia. Ocean & Coastal Management. 2021; 212: 105844. doi: 10.1016/j.ocecoaman.2021.105844
5. Li Z, Zhang X, Yang K, et al. Urban and rural tourism under COVID-19 in China: research on the recovery measures and tourism development. Tourism Review. 2021; 76(4): 718-736. doi: 10.1108/tr-08-2020-0357
6. Orner KD, Symonds EM, Madrigal-Solís H, et al. Holistically Managing Pathogens and Nutrients in Urbanizing Tropical Towns: Can Sanitation Technologies Create Safer Conditions for Beach Recreation? ACS ES&T Water. 2021; 1(5): 1184-1197. doi: 10.1021/acsestwater.0c00264
7. Khan SAR, Godil DI, Yu Z, et al. Adoption of renewable energy sources, low-carbon initiatives, and advanced logistical infrastructure—An step toward integrated global progress. Sustainable Development. 2021; 30(1): 275-288. doi: 10.1002/sd.2243
8. Zhang W, Jiang L. Effects of High-Speed Rail on Sustainable Development of Urban Tourism: Evidence from Discrete Choice Model of Chinese Tourists' Preference for City Destinations. Sustainability. 2021; 13(19): 10647. doi: 10.3390/su131910647
9. Ledesma González O, Merinero-Rodríguez R, Pulido-Fernández JI. Tourist destination development and social network analysis: What does degree centrality contribute? International Journal of Tourism Research. 2021; 23(4): 652-666. doi: 10.1002/jtr.2432
10. Wang X, Zhen F, Tang J, et al. Applications, Experiences, and Challenges of Smart Tourism Development in China. Journal of Urban Technology. 2021; 29(4): 101-126. doi: 10.1080/10630732.2021.1879605
11. Spagnoli L, Mundula L. Between Urban and Rural: Is Agricultural Parks a Governance Tool for Developing Tourism in the Periurban Areas? Reflections on Two Italian Cases. Sustainability. 2021; 13(14): 8108. doi: 10.3390/su13148108
12. Stetsenko SE, Yastrebova NA, Eterevskaya IN. Study of the Potential of the Territory for the Organization of Ecological Tourism on the Territory of the Volgograd Region and Measures for Its Development. IOP Conference Series: Earth and Environmental Science. 2022; 988(4): 042082. doi: 10.1088/1755-1315/988/4/042082
13. Qi X, Li X. Extraction Method of Tourism Sustainable Development Path under the Background of Artificial Intelligence + Smart City Construction. Journal of Interconnection Networks. 2022; 22(Supp02). doi: 10.1142/s0219265921430271
14. He B, Liu K, Xue Z, et al. Spatial and Temporal Characteristics of Urban Tourism Travel by Taxi—A Case Study of Shenzhen. ISPRS International Journal of Geo-Information. 2021; 10(7): 445. doi: 10.3390/ijgi10070445

15. Bui PL, Chen TL, Wickens E. Tourism industry resilience issues in urban areas during COVID-19. International Journal of Tourism Cities. 2021; 7(3): 861-879. doi: 10.1108/ijtc-12-2020-0289
16. Marques Pereira S. Regulation of short-term rentals in Lisbon: strike a balance between tourism dependence and urban life. Urban Research & Practice. 2020; 15(4): 477-504. doi: 10.1080/17535069.2020.1842901
17. Yang Y, Wu Y, Hu H. Modeling and Empirical Analysis of Regional Tourism Competitiveness Based on Niche Theory. Farouk A, ed. Discrete Dynamics in Nature and Society. 2021; 2021: 1-11. doi: 10.1155/2021/8384964
18. Liu S, Liu R, Tan N. A Spatial Improved-kNN-Based Flood Inundation Risk Framework for Urban Tourism under Two Rainfall Scenarios. Sustainability. 2021; 13(5): 2859. doi: 10.3390/su13052859