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An Empirical Study on the Coupling Coordination Degree of Rural Tourism and Rural Revitalization Strategy in Shangluo City

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Abstract— *To comprehensively advance rural revitalization and prioritize the development of agriculture and rural areas, rural tourism serves as a key engine driving rural revitalization, closely linked to rural development, farmers' income growth, and agricultural modernization. As a typical mountainous city, Shangluo is endowed with abundant rural tourism resources and agricultural assets. This study takes Shangluo City as a case study, employing the entropy method and a coupling coordination degree model to measure the comprehensive development levels and coupling coordination degree of the rural tourism and rural revitalization systems from 2012 to 2022. The results show that the coupling coordination degree between the two systems has steadily increased, evolving from a severely imbalanced stage in 2012 to a well-coordinated stage in 2022. However, challenges such as a singular product structure and inadequate coordination mechanisms persist during development. Based on these findings, optimization strategies are proposed, including strengthening product development, improving service quality, and establishing the brand of "Qinling's Most Beautiful Villages," with the aim of providing references for the integrated development of agriculture and tourism in Shangluo City and similar regions.*

Keywords— ***Shangluo City; rural tourism; rural revitalization; coupling coordination degree; development strategies。***

I. INTRODUCTION

1.1 Research Background and Significance

To comprehensively advance rural revitalization, prioritize the strategic development of agriculture and rural areas, consolidate and expand the achievements of poverty alleviation, accelerate the construction of an agricultural powerhouse, and vigorously promote the revitalization of rural industries, talents, culture, ecology, and organizations [1]. Rural tourism is a primary driving force for rural revitalization, closely linked to rural development, increases in farmers' income, and agricultural modernization. Promoting rural society and increasing the income of local residents are by-

products of tourism activities. Rural tourism involves the social, economic, cultural, and ecological reconstruction of villages. It has gradually become an important lever for revitalizing villages and a crucial means of consolidating the achievements of rural poverty reduction [2].

With the advancement of the rural revitalization strategy, rural tourism, as a new type of industry and economic growth point, is becoming an important means of promoting rural economic development and cultural heritage. Shangluo City is a typical mountainous city, rich in rural tourism resources and agricultural resources. In the process of rural revitalization, these resources also serve as carriers of great significance. Therefore, studying the relationship between rural tourism and rural revitalization in Shangluo City, and exploring their coupling coordination degree and development strategies, holds certain practical significance and research value.

This study aims to analyze the current situation, problems, and development trends of rural tourism and rural revitalization in Shangluo City, explore their coupling coordination degree, and propose corresponding development strategies, thereby providing theoretical and practical guidance for the sustainable development of rural tourism and rural revitalization in Shangluo City. Additionally, this study can offer a reference for the development of rural tourism and rural revitalization in other mountainous cities.

1.2 Research Objectives and Content

This study aims to take Shangluo City as a typical case, empirically analyze the coupling coordination degree of its rural tourism and rural revitalization systems by constructing an evaluation indicator system, and propose countermeasures and suggestions for promoting the synergistic development of the two based on the research conclusions. The specific research content includes:

(1) Systematically sorting out and diagnosing the current situation, achievements, and problems of rural tourism development and the implementation of the rural revitalization strategy in Shangluo City;

(2) Quantitatively measuring the comprehensive development levels and coupling coordination degree of the rural tourism and rural revitalization systems in Shangluo City from 2012 to 2022, and analyzing the characteristics of their temporal evolution;

(3) Based on the results of the empirical analysis, proposing optimization strategies and development suggestions to enhance the coupling coordination degree of rural tourism and rural revitalization in Shangluo City.

1.3 Research Methods

This study employs the literature review method, the entropy method, and the coupling coordination degree model, taking Shangluo City as the research object. Research conclusions are drawn through quantitative analysis of sample data and systematic review of literature. The specific methods are as follows:

(1) Literature Review Method. By extensively reviewing relevant domestic and international literature, this study systematically examines the theoretical connotations, interactive mechanisms, and research progress on the coupling coordination degree of rural tourism and rural revitalization, laying the foundation for constructing the theoretical framework, selecting evaluation indicators, and interpreting the research results.

(2) Entropy Method. The entropy method is an objective weighting method. Its basic principle is to determine weights based on the amount of information provided by the observed values of each indicator. This study uses the entropy method to objectively assign weights to indicators within the two subsystems, providing a basis for subsequent comprehensive evaluation and calculation of the coupling coordination degree.

(3) Coupling coordination degree: Coupling degree measures the intensity of interaction between systems, while coordination degree measures the extent of benign coupling and synergistic development between systems. Based on the calculated comprehensive development level of each subsystem, this study introduces the coupling coordination degree model to quantitatively evaluate

the coordinated development level and evolution trend of rural tourism and rural revitalization in Shangluo City.

Table 1: Rural Revitalization - Rural Tourism System Indicators

Coupled Subsystem	Primary Indicator	Secondary Indicator	Unit	Indicator Attribute
Rural Revitalization	Thriving Businesses (X_1)	Gross Output Value of Agriculture, Forestry, Animal Husbandry and Fishery X_{11}	100 million yuan	Positive
		Added Value X_{12}	100 million	Positive
		Total Power of Agricultural Machinery X_{13}	10,000 kilowatts (kW)	Positive
	Eco-friendly Environment (X_2)	Forest Coverage Rate X_{21}	%	Positive
		Sewage Treatment Rate X_{22}	%	Positive
		Harmless Treatment Rate of Domestic Waste X_{23}	%	Positive
	Social Etiquette and Civility (X_3)	Number of Students Enrolled in Regular Secondary Schools X_{31}	10,000 persons	Positive
		Radio Population Coverage Rate X_{32}	%	Positive
		TV Population Coverage Rate X_{33}	%	Positive
	Effective Governance (X_4)	Number of Medical and Health Institutions X_{41}	unit	Positive
		Number of Beds in Medical and Health Institutions X_{42}	unit	Positive
		Urban-Rural Income Ratio (Rural Resident Income = 1) X_{43}	%	Negative
	Prosperous Life (X_5)	Per Capita Disposable Income of Rural Residents X_{51}	yuan (RMB)	Positive
		Number of Household Cars Owned X_{52}	per 100 households	Positive
		Engel Coefficient of Rural Residents X_{53}	%	Negative
Rural Tourism	Industrial Support (Y_1)	Number of Star-Rated Hotels Y_{11}	unit	Positive
		Good Air Quality Rate Y_{12}	%	Positive
	Economic Benefit (Y_2)	Passenger Turnover Y_{21}	10,000 passenger-kilometers	Positive
		Number of Tourist Arrivals Y_{22}	10,000 person-times	Positive
		GDP Y_{23}	100 million yuan	Positive

1.4 Indicator System and Data Sources

1.4.1 Constructing the Indicator System

By consulting the planning indicators in the Shaanxi Statistical Yearbook (2012-2022) and the "Shaanxi Rural Revitalization Strategic Plan (2018-2022)", and considering the scientificity, representativeness, and availability of data, an indicator system was constructed. Five primary indicators were established for rural revitalization and two primary indicators for rural tourism. Among these, 20 secondary indicators, including forest coverage rate, the number of students enrolled in regular secondary schools, and total tourism revenue, were used to construct the coupling system indicators for the two systems in Shangluo City (see Table 1).

1.4.2 Data Sources

The research data are sourced from the Shaanxi Statistical Yearbook (2012–2022), the Statistical Bulletin of National Economic and Social Development of Shangluo City (2012–2022), the Shangluo Statistical Yearbook, the official website of the Shangluo Municipal Bureau of Culture, Radio, Television and Tourism, as well as statistics and reports related to rural tourism in Shangluo City.

1.5 Current State of Domestic and International Research on Rural Tourism and Rural Revitalization

1.5.1 Current State of Domestic Research on Rural Tourism and Rural Revitalization

In recent years, rural tourism and rural revitalization have become focal points of interest among domestic scholars. Yin Changfeng [3] employed a multi-indicator comprehensive evaluation method and a system coupling coordination degree model to analyze the comprehensive development levels of the rural tourism system and the rural revitalization system in Anhui Province, as well as the degree of coupling coordination between them. The study found that the coupling coordination degree was low and exhibited significant regional disparities. Wei An et al. [4] constructed an evaluation indicator system for the two systems, revealing that the coupling coordination degree between them showed an upward trend, albeit a slow one. Shi Xundong et al. [5] took the Yangtze River Delta region as a case study, finding that the industrial coupling coordination degree of leisure agriculture and rural tourism generally demonstrated a steady upward trend; however, the pandemic had a certain adverse impact on the integration of agriculture and tourism.

1.5.2 Current State of International Research on Rural Tourism and Rural Revitalization

International research primarily focuses on the following three aspects. Regarding sustainable development, Blancas [6] proposed sustainable development strategies for rural tourism in the Andalusia region of Spain. Liu [7] suggested that while promoting rural tourism, local development should prioritize economic benefits while also emphasizing the sustainable development capacity of local communities, cautioning against the pursuit of economic growth at the expense of local carrying capacity. In terms of tourism planning and marketing research, Gartner [8] argued that the marketing focus of rural tourism lies in preserving rural characteristics, and that the shaping of rural tourism images and brand influence is constrained by modern media industry conditions. Concerning the integration of rural revitalization and the tourism industry, Komppula [9] emphasized strengthening cooperation among rural tourism destinations and related enterprises, with a focus on innovation. Richards [10] indicated that rural revitalization and the tourism industry are converging into a new industrial sector that promotes economic development.

Overall, both domestic and international research indicate that rural tourism is one of the important pathways for promoting rural revitalization. The key to fostering the synergistic development of the two lies in focusing on protecting and enhancing the local ecological environment and cultural characteristics, while simultaneously emphasizing the development and promotion of tourism products to meet the needs of tourists.

II. ANALYSIS OF THE CURRENT SITUATION OF RURAL TOURISM AND RURAL REVITALIZATION IN SHANGLUO CITY

2.1 Overview of Rural Tourism Resources in Shangluo City

Shangluo City has an administrative area of 19,300 square kilometers, encompassing six counties—Danfeng, Luonan, Shangnan, Shanyang, Zhen'an, Zhashui—and Shangzhou District. Located deep in the Qinling Mountains, Shangluo boasts a beautiful environment with lush mountains and clear waters, earning it the title of "China's Capital for Climatic Wellness." It is rich in rural tourism resources. The city features complex topography and geomorphology, picturesque landscapes, and abundant cultural relics and historic sites, presenting a diverse array of natural and cultural attractions. The region has over 1,200 ancient sites, ancient buildings, and other cultural heritage protection points, including more than 20 at the provincial level

and above [11]. In recent years, Shangluo has actively promoted the development strategy for the rural tourism industry. Leveraging its abundant ecological and cultural tourism resources, along with increasingly convenient transportation conditions, the meticulously developed model villages for rural beauty have become the "Eight Golden Flowers" of Shangluo's rural tourism development, with tourism revenue and growth rates showing a significant upward trend [12].

2.2 Current Situation of Rural Revitalization Strategy Implementation in Shangluo City

Shangluo City is one of the key areas for national poverty alleviation and development. In recent years, the Shangluo municipal government has introduced a series of rural revitalization strategic guidelines, such as the "Three Belts and One Zone" and "Ten Major Industries" initiatives, focusing on the development of cultural tourism, characteristic agriculture, under-forest economy, and family farms, thereby promoting the transformation and upgrading of the rural economy [13]. Simultaneously, efforts have been made to actively promote the development of new rural business entities, integrating agricultural resources, improving agricultural quality, expanding sales channels, and boosting rural economic development through forms such as family farms, farmer cooperatives, and rural e-commerce. Overall, Shangluo City has achieved certain successes in implementing the rural revitalization strategy, but it still faces challenges such as a singular industrial structure, outdated agricultural production technologies, and insufficient rural infrastructure.

III. EMPIRICAL STUDY ON THE COUPLING COORDINATION DEGREE OF RURAL TOURISM AND RURAL REVITALIZATION IN SHANGLUO CITY

This study employs a combination of the entropy method and the coupling coordination degree model, collecting relevant data and materials to conduct an empirical study on the coupling coordination degree of rural tourism and rural revitalization in Shangluo City.

3.1 Data Processing and Model Construction

3.1.1 Descriptive Statistics of Data

To identify the impact of extreme outliers on model construction, descriptive statistical analysis was conducted on the indicators of the rural revitalization and rural tourism systems using SPSS 27.0 (see Table 2). The analysis results show that from 2012 to 2022, the standard deviation of each secondary indicator did not exceed its mean, indicating the absence of extreme outliers and that the data are valid for use in coupling coordination modeling.

3.1.2 Indicator Weight Calculation

To enable objective weighting, the entropy method is used to calculate indicator weights. The greater the entropy, the more disordered the data, the less information it carries, and the lower its utility value, resulting in a lower weight. The entropy method [14] is a research approach that combines the information values provided by entropy to determine weights. The calculation steps are as follows:

(1) Establish the original indicator data matrix

Suppose the system has a years and b indicators. Then the original data matrix is $X=X_{(ij)a\times b}$, representing the value of the i-thevaluation indicator for the j-th evaluation object.

(2) Data standardization processing

Since the units and nature of the indicators measuring the level of rural revitalization and rural tourism are significantly different, in order to obtain true and objective results, this study adopts the min-max standardization method. Referring to the research of scholars such as He Lingling and Chen Guosheng, time is set as a variable. The specific formulas are as follows:

Positive indicator:

$$X'_{ij}=\frac{X_{ij}-\min(X_{ij})}{\max(X_{ij})-\min(X_{ij})}+\theta \quad (1)$$

Negative indicator:

$$X'_{ij}=\frac{max(X_{ij})-X_{ij}}{max(X_{ij})-min(X_{ij})}+\theta \quad (2)$$

Among them, X_{ij} and X'_{ij} represent the original data value and the standardized data value of the j-th$(j=1,2,3,\ldots,b)$ indicator in the i-th$(i=1,2,3,\ldots,a)$ year, respectively; while $max(X_{ij})$ and $min(X_{ij})$

represent the maximum and minimum values of each data indicator in the two systems, respectively. Meanwhile, to eliminate the influence of zero and negative values, this study adds a minimum unit value θ to all standardized data results to meet the operational requirements, taking θ=0.0001.

Table 2: Descriptive Statistics of the Rural Revitalization–Rural Tourism System: Indicator Name and Sample

	Sample	Minimum	Maximum	Mean	Standard Deviation
Gross Output Value of Agriculture, Forestry, Animal Husbandry and Fishery (100 million yuan)	11	139.55	234.73	184.4918	29.21587
Added Value (100 million yuan)	11	79.43	133.63	104.657391	16.32332
Total Power of Agricultural Machinery (10,000 kW)	11	67.63	95.28	76.8291	9.89426
Forest Coverage Rate (%)	11	62.4	69.56	65.5755	2.54387
Sewage Treatment Rate (%)	11	84.42	99.52	91.2127	4.9685
Harmless Treatment Rate of Domestic Waste (%)	11	91.39	100	96.1773	2.76142
Number of Students Enrolled in Regular Secondary Schools (10,000 persons)	11	10.84	17.8	12.0555	2.17086
Radio Population Coverage Rate (%)	11	93.87	98.81	96.7873	1.58129
TV Population Coverage Rate (%)	11	98.45	99.71	99.1355	0.4191
Number of Medical and Health Institutions (unit)	11	2662	3119	2862.36	152.666
Number of Beds in Medical and Health Institutions (unit)	11	9060	16151	13233.73	2485.982
Urban-Rural Income Ratio (Rural Resident Income = 1)	11	2.34	3.64	2.83	0.43361
Per Capita Disposable Income of Rural Residents (yuan)	11	5425	12781	8953.55	2330.499
Number of Household Cars Owned (per 100 households)	11	19	35	29.64	4.501
Engel Coefficient of Rural Residents (%)	11	28.2	35.6	30.2	1.9277
Number of Star-Rated Hotels (unit)	11	10	20	15.45	3.643
Good Air Quality Rate (%)	11	84.93	96.2	92.5673	3.39366
Passenger Turnover (10,000 passenger-kilometers)	11	71563	133825.41	93455.8409	17896.95351
Number of Tourist Arrivals (10,000 person-times)	11	2288.33	6556.28	4180.53	1375.78565
GDP(100 million yuan)	11	387.21	902.56	667.6973	168.92499

(3) Calculate the proportion of each indicator. The proportion P_{ij} of the j-th (or column) indicator in the i-th year (or row) is:

$$P_{ij} = \frac{X'_{ij}}{\sum_{b}^{a} X'_{ij}} \quad (3)$$

(4) Calculate the entropy value of the indicator. The entropy value of the j-th indicator is D_j:

$$D_j = \frac{1}{\ln a}\sum_{i=1}^{a} P_{ij} \ln P_{ij} \ ,(0 \le D_j \le 1) \quad (4)$$

(5) Calculate the entropy redundancy of the indicator G_j:

$$G_j = 1 - D_j \quad (5)$$

(6) Calculate the weight result W_j:

$$W_j = \frac{G_j}{\sum_{j=1}^{b} G_j} \quad (6)$$

(7) Measure the comprehensive development level index. The linear weighting method is used to

measure the comprehensive development level of rural tourism and rural revitalization in Shangluo City respectively. The comprehensive development level of the *i*-th evaluation object is:

$$U_j = \sum_{j=1}^{b} W_j \times X_{ij}^{'} \quad (7)$$

The calculation results are shown in Table 3 below.

Table 3: Summary of Weight Calculation Results Using the Entropy Method

Coupled Subsystem	Primary Indicator	Secondary Indicator	Information Entropy Value *e*	Information Utility Value *d*	Weight Coefficient *w*
Rural Revitalization	Thriving Businesses (X_1)	Gross Output Value of Agriculture, Forestry, Animal Husbandry and Fishery(100 million yuan) X_{11}	0.908	0.092	4.204
		Added Value(100 million) X_{12}	0.908	0.092	4.17
		Total Power of Agricultural Machinery(kW)X_{13}	0.917	0.083	3.759
	Eco-friendly Environment(X_2)	Forest Coverage Rate(%) X_{21}	0.835	0.165	7.506
		Sewage Treatment Rate(%) X_{22}	0.882	0.118	5.349
		Harmless Treatment Rate of Domestic Waste(%)X_{23}	0.916	0.084	3.811
	Social Etiquette and Civility (X_3)	Number of Students Enrolled in Regular Secondary Schools (10,000 persons) X_{31}	0.574	0.426	19.367
		Radio Population Coverage Rate (%)X_{32}	0.927	0.073	3.338
		TV Population Coverage Rate (%) X_{33}	0.91	0.09	4.096
	Effective Governance (X_4)	Number of Medical and Health Institutions (unit) X_{41}	0.875	0.125	5.667
		Number of Beds in Medical and Health Institutions (unit) X_{42}	0.913	0.087	3.959
		Urban-Rural Income Ratio (Rural Resident Income = 1) X_{43}	0.926	0.074	3.358
	Prosperous Life (X_5)	Per Capita Disposable Income of Rural Residents (yuan) X_{51}	0.899	0.101	4.591
		Number of Household Cars Owned (per 100 households) X_{52}	0.948	0.052	2.369
		Engel Coefficient of Rural Residents (%) X_{53}	0.957	0.043	1.939
Rural Tourism	Industrial Support (Y_1)	Number of Star-Rated Hotels (unit) Y_{11}	0.895	0.105	4.781
		Good Air Quality Rate (%) Y_{12}	0.945	0.055	2.51
	Economic Benefit (Y_2)	Passenger Turnover (10,000 passenger-kilometers) Y_{21}	0.866	0.134	6.076
		Number of Tourist Arrivals (10,000 person-times) Y_{22}	0.886	0.114	5.167
		GDP (100 million yuan) Y_{23}	0.912	0.088	3.983

Using the entropy method to calculate the weights of a total of 20 indicators, including the gross output value of agriculture, forestry, animal husbandry, and fishery, it can be seen from the table that the number of students enrolled in regular secondary schools (X_{31}) has the highest weight

(0.18306), while the Engel coefficient of rural residents (X_{53}) has the lowest weight (0.01833).

3.1.3 Measurement of Comprehensive Development Level

Based on the standardized indicator values and their respective weights, the comprehensive development level of each subsystem is calculated using the formulas described above. The comprehensive development levels of the rural tourism system and the rural revitalization development system are shown in Table 4.

Table 4: Comprehensive Development Level of the Rural Revitalization-Rural Tourism System

Year	Rural Revitalization	Rural Tourism
2012	0.330	0.265
2013	0.375	0.397
2014	0.367	0.458
2015	0.378	0.456
2016	0.267	0.400
2017	0.313	0.544
2018	0.345	0.626
2019	0.382	0.691
2020	0.458	0.474
2021	0.536	0.512
2022	0.605	0.813

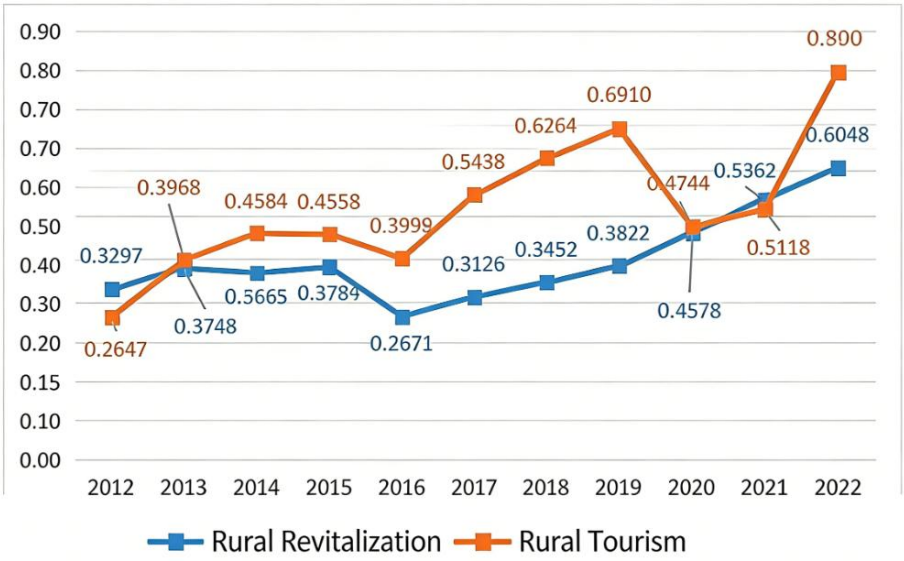

Fig. 1 Trend Chart of the Comprehensive Development Level of the Rural Revitalization-Rural Tourism System

Based on the standardized indicator values and their respective weights, the comprehensive development level of each subsystem is calculated. The results are shown in Table 4 and Figure 1. From 2012 to 2022, the comprehensive development level index of rural revitalization in Shangluo City increased from 0.330 to 0.605, an increase of nearly 1.83 times; the comprehensive development level index of rural tourism increased from 0.265 to 0.813, an increase of 3.07 times, showing a significant increase.

3.2 Analysis of the Coupling Coordination Degree between Rural Tourism and Rural Revitalization in Shangluo City

The coupling coordination degree model can objectively reflect the level of coordinated

development between two or more systems. Therefore, this model is introduced for measurement, with the formula as follows:

$$C=\frac{\sqrt[2]{U_1U_2}}{U_1+U_2} \quad (8)$$

$$D=\sqrt{C\times T} \quad (9)$$

$$T=\alpha U_1+\beta U_2 \quad (10)$$

C represents the coupling degree between the rural revitalization and rural tourism systems, with $0 \leq C \leq 1$. U_1 and U_2 denote the comprehensive development levels of the two systems, respectively. D represents the coupling coordination degree of the two systems, T represents the comprehensive coordination index, and α and β are coefficients. This study considers rural revitalization and rural tourism to be equally important; therefore, α and β are each set to 0.5. The closer the D value is to 1, the better the coupling coordination between the two. To more intuitively evaluate the state of coupling coordination between rural revitalization and rural tourism, the coupling coordination types are divided into the following ten categories according to the study by Liao Chongbin [15], as shown in Table 5:

Table 5: Classification Criteria for Coupling Coordination Degree

D value interval	Coordination level	Degree of coupling coordination
(0.0,0.1)	1	Extreme Disorder
[0.1,0.2)	2	Severe Disorder
[0.2,0.3)	3	Moderate Disorder
[0.3,0.4)	4	Mild Disorder
[0.4,0.5)	5	Near Disorder
[0.5,0.6)	6	Barely 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	High-Quality Coordination

Table 6: Coupling Degree and Coupling Coordination Degree of Rural Revitalization and Rural Tourism in Shangluo City (2012–2022)

Year	Coupling Degree (C Value)	Coupling Status	Coordination Index (T Value)	Coupling Coordination Degree (D Value)	Coordination Level	Degree of Coupling Coordination
2012	0.1771	Low Coupling	0.2017	0.1890	2	Severe Disorder
2013	0.6946	High Coupling	0.3744	0.5100	6	Barely Coordination
2014	0.7915	High Coupling	0.3975	0.5609	6	Barely Coordination
2015	0.6660	High Coupling	0.4075	0.5210	6	Barely Coordination
2016	0.5344	Moderate Coupling	0.4319	0.4804	5	Near Disorder
2017	0.8541	Extreme Coupling	0.5335	0.6750	7	Primary Coordination
2018	0.8635	Extreme Coupling	0.5827	0.7094	8	Intermediate Coordination
2019	0.8543	Extreme Coupling	0.6447	0.7421	8	Intermediate Coordination
2020	0.7172	High Coupling	0.6399	0.6774	7	Primary Coordination
2021	0.6793	High Coupling	0.7000	0.6896	7	Primary Coordination

2022	0.8536	Extreme Coupling	0.8287	0.8410	9	Good Coordination

By collecting the relevant indicator data of the rural revitalization and rural tourism systems in Shangluo from 2011 to 2022, the weights, comprehensive development level index, coupling degree, and coupling coordination degree of each indicator were calculated using the formulas. The final results are shown in Table 6.

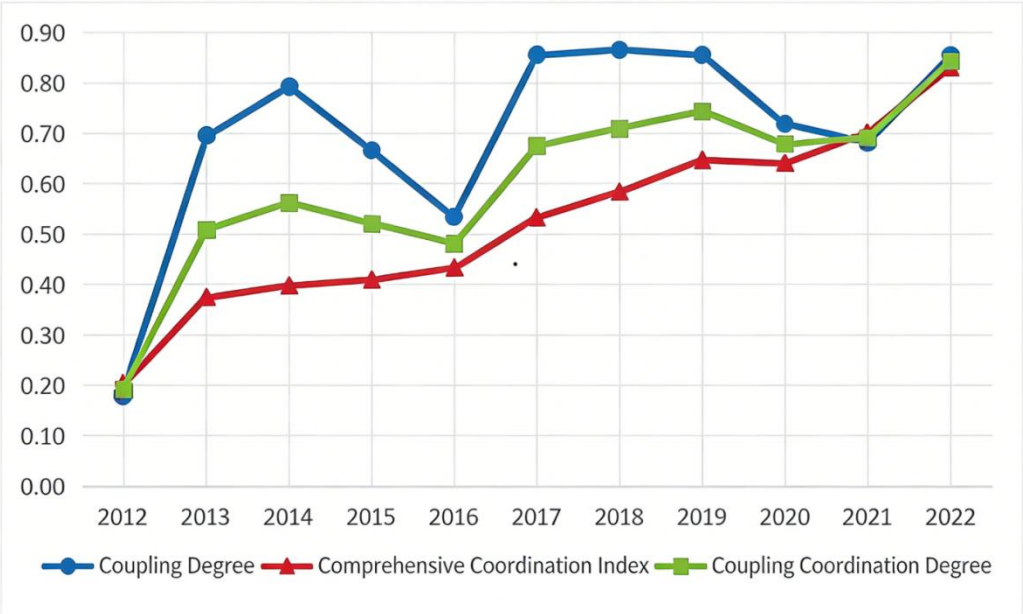

Fig. 2 Temporal Change of Coupling Degree and Coupling Coordination Degree between Rural Tourism and Rural Revitalization Strategy in Shangluo City

The calculation results are shown in Table 6 and Figure 2. From 2012 to 2022, the coupling degree between the rural tourism and rural revitalization systems in Shangluo City was mostly above 0.6, reaching a state of high coupling, with the coupling degree exceeding 0.8 in four of those years, indicating extremely high coupling. The coupling coordination degree increased steadily from 0.1890 in 2012 to 0.8410 in 2022, achieving a transformative shift from severe disorder to good coordination.

From the perspective of temporal evolution, the coupling coordination degree of the two systems underwent a stepwise progression: "severe disorder — near disorder — barely coordination — primary coordination — good coordination." Specifically: in 2012, the system was in a state of severe disorder, indicating that the rural revitalization strategy had not yet been fully implemented and rural tourism was still in its initial exploratory phase, with no significant synergistic effects between the two. From 2013 to 2015, the system entered a state of barely coordination, as rural tourism began to gain momentum and initially formed interactions with rural revitalization. In 2016, affected by the macroeconomic environment, the coordination degree experienced a temporary decline to near disorder. From 2017 onward, with the comprehensive implementation of the rural revitalization strategy, the government increased policy support and directed more funding and human resources toward rural tourism, promoting integrated urban-rural development, beautiful village construction, and industrial transformation and upgrading. As a result, the coordination degree steadily improved, reaching intermediate coordination in 2018–2019 and further advancing to good coordination in 2022, demonstrating a trend of benign synergistic development.

IV. OPTIMIZATION STRATEGIES FOR THE COUPLING COORDINATION DEGREE BETWEEN RURAL TOURISM AND RURAL REVITALIZATION IN SHANGLUO CITY

Based on the preceding empirical analysis, to address the issues existing in the coordinated development of rural tourism and rural revitalization in Shangluo City, optimization efforts should focus on five aspects: planning guidance, product development, service quality, brand building, and strategic coordination.

In terms of planning guidance, government departments should formulate special guidelines for the development of rural tourism in Shangluo City, integrate resources from departments such as agriculture, forestry, water conservancy, and rural revitalization, and combine the development of rural tourism with the relocation of residents in southern Shaanxi. The focus should be on creating comprehensive tourism projects that integrate ecological scenic areas, agricultural parks, rural folk customs, and leisure vacations. In terms of product development, diversified products such as cultural tourism, leisure tourism, and agricultural sightseeing should be developed based on market demand to meet the diverse needs of tourists. Simultaneously, attention should be paid to cultural protection and ecological conservation, and collaboration with surrounding areas should be strengthened to jointly develop cross-regional tourism routes, enhancing overall market competitiveness. Regarding service quality improvement, training for practitioners should be strengthened to enhance service awareness and professional skills; infrastructure construction related to transportation, accommodation, and sanitation should be improved; and a sound service quality supervision and evaluation mechanism should be established to ensure visitors receive a high-quality tourism experience. In terms of brand building, the overall image of rural tourism should be integrated. Agricultural festivals such as the "Walnut Festival" and "Fruit Picking" activities should be regularly held, high-quality promotional videos should be produced, and benchmark projects such as "Demonstration Villages for Rural Tourism" and "Characteristic Tourism Towns" should be developed to establish the unified brand image of "The Most Beautiful Villages in the Qinling Mountains", thereby enhancing the visibility and reputation of rural tourism in Shangluo City. Regarding strategic coordination, efforts should be made from two dimensions: publicity and guidance, and industrial planning. For publicity and guidance, a publicity team should be established to promote rural revitalization policies through means such as door-to-door outreach and WeChat official accounts, enhancing villagers' awareness and sense of participation. For industrial planning, scientific three-level industrial revitalization plans at the county, township, and village levels should be formulated, with a focus on developing green industries such as organic agriculture, sightseeing agriculture, and rural homestays. This will effectively transform ecological advantages into economic advantages, turning lucid waters and lush mountains into invaluable assets, and achieving the deep integrated development of rural tourism and rural revitalization.

V. CONCLUSION

This study conducted an empirical study and evaluation of the coupling coordination degree between rural tourism and rural revitalization in Shangluo City, and proposed optimization strategies. The research results show that from 2012 to 2022, the comprehensive development levels of both rural tourism and rural revitalization in Shangluo City exhibited an upward trend, and their coupling coordination degree improved from severe disorder to good coordination, indicating that the synergistic effect has gradually emerged. However, problems such as the singularity of rural tourism products, inadequate implementation of the rural revitalization strategy, and imperfect coordination mechanisms still exist. In response to these issues, this study proposes optimization strategies such as strengthening product development, improving service quality, and building the "Most Beautiful Villages in the Qinling Mountains" brand, providing

a reference for the coordinated development of rural tourism and rural revitalization in Shangluo City.

This study still has certain limitations: constrained by time and funding, the scope and depth of field research were limited; there is some uncertainty regarding the reliability and completeness of the data sources; and the research conclusions are based on the case study of Shangluo City, so their generalizability requires further verification.

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