

Study on the Economic Impact Factors of Rural Tourism

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Abstract: The importance of the influencing factors of rural tourism in the Ordos is analyzed to provide a reference for the sustainable development of rural tourism. Using gray correlation analysis, 11 indicators in four aspects of the economy, resources, environment, and society were selected from 2015 to 2019 to evaluate the main influencing factors and importance of the rural tourism economy in the Ordos. The research results show that the largest gray correlation between the rural tourism economy of Ordos and each index is economy, followed by society, resources, and environment. Thus, the path to optimizing the development of the rural tourism economy is proposed.

Keywords: rural tourism economy; influencing factors; grey correlation analysis; Ordos

1 Introduction

In recent years, China has issued a number of documents to support the development of rural tourism, giving strong support to the development of rural tourism in China. 866.54 million rural tourists in China in 2021, an increase of 55.5% year-on-year. Rural tourism plays an important role in the employment of the rural population, improving the rural environment, and driving economic growth in other rural industries.

Currently, Chinese scholars have studied issues related to the concept of rural tourism (Xiao, Y. x, et al. 2001; He, J. m et al. 2002;), sustainable development of rural tourism (Du, J et al. 1999; Zou, T. q, 2005), rural tourism development models (Zheng, Q. m, et al. 2004; Ma, Y, et al. 2007;), sustainable development of rural tourism (Zhou, L. q et al. 2004;), rural tourism policy experiences (Wang, Y. c 2002;), and driving mechanisms of rural tourism development (Zou, T. q 2006).

The research results of rural tourism mainly focus on: the high-quality development of rural tourism, (Yu, F.j, et al., 2015; Wu, Y. h, 2021; Dong, J, 2021); research on the competitiveness

of rural tourism, development potential (Wang, S.y, 2021; Sun, Z. et al., 2021); research on the evaluation index system of rural tourism development.

Research methods mainly use the principal component analysis (Jia, Y, 2022), TOPSIS measure (Liu, H, 2021), GIS technology method (Liu, X, 2010), hierarchical analysis (Wang, F, 2008; Li, T et al., 2014;), SERVQUAL evaluation method (Fei, W. j, 2021), TPB analysis method (Zhang, Y. g, et al., 2017) DEMATEL method (Lu, X.l, et al., 2017) based on IPA method (Zhou, N.d, et al., 2018), etc.

In conclusion, the research on rural tourism in the Ordos using gray correlation analysis has not been studied, how to analyze the main factors affecting the development of rural tourism in the Ordos in the prosperous development of rural tourism is of research significance for promoting the sustainable development of rural tourism.

2 Research methods

2.1 Introduction to Research Methodology

Professor Ju long Deng proposed the gray system theory in 1982[1], which is a method to study data and information uncertainty. One branch of gray system theory is gray correlation analysis, which can determine the degree of correlation between various factors and determine the correlation by analyzing the similarity of the change curves of different factors. It is an analytical method used to assess things and phenomena affected by various factors in a holistic concept and integrated manner.

2.2 The calculation process

First, establish an evaluation index system and collect relevant data.

When there are m objects and n indicators, the matrix of the comparison series is as follows:

$$(X_1, X_2, \dots, X_n) = \begin{pmatrix} X_{11} & X_{21} & \dots & X_{n1} \\ X_{12} & X_{22} & \dots & X_{n2} \\ \dots & \dots & \dots & \dots \\ X_{1m} & X_{2m} & \dots & X_{nm} \end{pmatrix} \quad (1)$$

Reference Data

$$X_0 = (X_1, X_2, \dots, X_n) \quad (2)$$

Second, process the data infinitely. Since each data set has different dimensions and is not easily comparable, the raw data should be dimensionless.

Formula:

$$Z_{ij} = \frac{x_{ij}}{\sum_{i=1}^m x_{ij}} \quad (3)$$

Third, the correlation coefficient between the comparison series and the reference series is calculated.

$$\zeta_i(k) = \frac{\min_i \min_k |x_0(k) - x_i(k)| + \rho \cdot \max_i \max_k |x_0(k) - x_i(k)|}{|x_0(k) - x_i(k)| + \rho \cdot \max_i \max_k |x_0(k) - x_i(k)|} \quad (4)$$

Among them, $\rho=0.5$

Fourth, calculate the correlation degree. The formula is:

$$r_i = \frac{1}{m} \sum_{k=1}^m \zeta_i(k) \quad (5)$$

3 Constructing the index system

3.1 Data sources

This paper uses data related to the development of rural tourism in Ordos City from 2015 to 2019, which are obtained from the Statistical Yearbook of Ordos City, the Bureau of Data and Statistics of Ordos City, and the Bureau of Environment of Ordos.

3.2 Ordos rural tourism development evaluation index system construction

Construction of evaluation index system (Table 1)

Table 1: Ordos rural tourism development evaluation index system

Target layer	Guideline layer	Indicator layer
Rural tourism development evaluation	Economy	Per capita disposable income of rural residents Total revenue of rural tourism
	Resources	Forest coverage Surface water supply Groundwater source supply
	Environment	Annual average ratio of good air days PM2.5 annual daily average Domestic garbage disposal rate
	Society	Rural resident population Number of rural tourism employees Number of rural tourism receivers

Gray correlation calculation: Based on the data on rural tourism development in Ordos City from 2015 to 2019, the total tourism income (100 million yuan) is set as x_0 , the per capita income

available to rural residents (yuan) is set as x_1 , the total rural tourism income (100 million yuan) is set as x_2 , the forest coverage rate (%) is X_3 , the water supply from surface water sources (million m³) is X_4 , the water supply from groundwater sources (million m³) is X_5 , The annual average daily air quality ratio (%) is X_6 , the annual average daily air quality ratio of PM2.5 ($\mu\text{g}\cdot\text{m}^3$) is X_7 , the domestic waste disposal rate (%) is X_8 , the rural resident population (10,000 people) is X_9 , the rural tourism employees (people) are X_{10} , and the rural tourism receivers (10,000 people) are X_{11} . (Table 2)

Table 2: Evaluation data of green development of rural tourism in Ordos

YEAR	2015	2016	2017	2018	2019
X_0	255.9	313.9	378.3	441.3	508
X_1	14420	15480	16729	18289	20075
X_2	11.8	8.31	9.64	11.4	13.12
X_3	26.51	26.70	26.86	26.90	27.03
X_4	588.52	590.55	564.96	565.17	558.99
X_5	874.88	840.08	899.45	836.01	968.72
X_6	83.4	87.4	87.4	80	90.8
X_7	27	23	24	23	23
X_8	95.57	97.02	97.35	98.93	99.13
X_9	54.96	54.38	53.68	53.02	52.02
X_{10}	534	1500	3000	4000	6694
X_{11}	440	421.04	495.54	545.44	651.26

Dimensionless processing of raw data using normalization formula (Table 3)

Table 3: Dimensionless processing results

YEAR	2015	2016	2017	2018	2019
X_0	0.1349	0.1654	0.1994	0.2326	0.2677
X_1	0.1697	0.1821	0.1968	0.2152	0.2362
X_2	0.2174	0.1531	0.1776	0.2101	0.2418
X_3	0.1978	0.1993	0.2004	0.2007	0.2017
X_4	0.2052	0.2059	0.1970	0.1970	0.1949
X_5	0.1980	0.1901	0.2035	0.1892	0.2192
X_6	0.1944	0.2037	0.2037	0.1865	0.2117

X ₇	0.2250	0.1917	0.2000	0.1917	0.1917
X ₈	0.1958	0.1988	0.1995	0.2027	0.2031
X ₉	0.2050	0.2029	0.2003	0.1978	0.1941
X ₁₀	0.0340	0.0954	0.1907	0.2543	0.4256
X ₁₁	0.1723	0.1649	0.1942	0.2136	0.2550

First, the absolute value of the difference between the reference series and the comparison series is calculated; second, the two-step maximum and minimum values are calculated; finally, the correlation coefficient is calculated by replacing the above formula. (Table 4)

Table 4: Ordos rural tourism development off contact number

YEAR	2015	2016	2017	2018	2019
X ₁	0.6950	0.8266	0.9701	0.8205	0.7155
X ₂	0.4895	0.8663	0.7851	0.7791	0.7534
X ₃	0.5570	0.7011	0.9880	0.7136	0.5453
X ₄	0.5296	0.6621	0.9718	0.6905	0.5208
X ₅	0.5565	0.7630	0.9513	0.6461	0.6202
X ₆	0.5708	0.6743	0.9491	0.6322	0.5855
X ₇	0.4675	0.7516	0.9936	0.6595	0.5100
X ₈	0.5650	0.7038	1.0000	0.7266	0.5507
X ₉	0.5302	0.6793	0.9904	0.6951	0.5180
X ₁₀	0.4395	0.5305	0.9026	0.7851	0.3338
X ₁₁	0.6793	0.9943	0.9398	0.8072	0.8625

Calculate the correlation degree of 11 indicators affecting four aspects of economic, resource, environmental, and social development of rural tourism in the Ordos. (Table 5)

Table 5: Correlation of indicators of rural tourism development in Ordos

Guideline layer	Indicator layer	Relevance	
Economy	X ₁	0.8055	0.7701
	X ₂	0.7347	
	X ₃	0.7010	
Resources	X ₄	0.6750	0.6945
	X ₅	0.7074	
	X ₆	0.6824	
Environment	X ₇	0.6764	0.6893

	X ₈	0.7092	
	X ₉	0.6826	
Society	X ₁₀	0.5983	0.7125
	X ₁₁	0.8566	

Tables 5 show that: the correlation degree of each of the 11 selected indicators with the total tourism revenue is greater than 0.5, indicating a relatively strong correlation. According to the degree of correlation, the 11 indicators are ranked as X₁₁, X₁, X₂, X₈, X₅, X₃, X₉, X₆, X₇, X₄, and X₁₀. The highest correlation with rural tourism is the highest correlation with the number of rural tourism receptions, and the lowest correlation with rural tourism is the number of rural tourism employees. The correlations of two indicators are greater than 0.75, namely, the per capita disposable income of rural residents (0.8055) and the number of rural tourism employees (0.8566), while the correlations of the remaining nine indicators range from 0.5 to 0.75, namely, the total income of rural tourism (0.7347), the forest coverage rate (0.7010), the water supply from surface water sources (0.6750), the water supply from groundwater sources (0.707), and the water supply from groundwater sources (0.707). (0.7074), annual average ratio of good air days (0.6824), annual average daily value of PM2.5 (0.6764), domestic waste disposal rate (0.7092), the rural resident population (0.6826), and a number of the rural tourism employees (0.5983).

Based on the magnitude of the correlation of indicators, combined with the calculation results (Table 3-5), the four factors affecting the development of rural tourism in the Ordos are ranked from small to large as environment < resources < society < economy. According to the range of correlation degrees, the correlation degree of the economic factor is greater than 0.75, so the economic factor has a strong correlation with the total tourism income, and the economic factor occupies an important position in the development of rural tourism in the Ordos. And the correlation degree of resource, environment, and social factors are all between 0.5 and 0.75, and their correlation degree is also stronger.

4 Analysis of the influencing factors conclusion

4.1 Analysis of economic factors

The economic factor has the strongest correlation with the total tourism income of Ordos, with the correlation degree of 0.7701. The economic factors include two indicators: the per capita disposable income of rural residents and the total income of rural tourism. The correlation between the per capita disposable income of rural residents and the total income of rural tourism is 0.8055, and the correlation with the total income of rural tourism is 0.7347. the stronger correlation between these two indicators is the disposable income of rural residents.

4.2 Analysis of resource factors

The economic factor has the strongest correlation with the total tourism income of Ordos, with a correlation degree of 0.7701. The economic factors include two indicators: the per capita disposable income of rural residents and the total income of rural tourism. The correlation between the per capita disposable income of rural residents and the total income of rural tourism

is 0.8055, and the correlation with the total income of rural tourism is 0.7347. the stronger correlation between these two indicators is the disposable income of rural residents.

4.3 Analysis of environmental factors

The indicators of environmental factors are the annual average ratio of good air days, with a correlation of 0.6824; the annual average daily value of PM2.5, with a correlation of 0.6764; and the domestic waste disposal rate, with a correlation of 0.7092. The strongest correlation among the three indicators is the domestic waste disposal rate, and the low correlation is the annual average daily value of PM2.5. The overall correlation of environmental factors is 0.6893, which is relatively strong, and is the lowest correlation among the four influencing factors of rural tourism development in the Ordos.

4.4 Analysis of social factors

The correlation between social factors and total tourism income is higher, and social factors are in the second place among the four influencing factors on the development of rural tourism in the Ordos. The correlation of the number of rural tourism receivers of the three indicators under social factors (0.8566) is greater than the correlation between the rural permanent population (0.6826) and the correlation of the number of rural tourism employees (0.5983).

5 Conclusion

By analyzing the factors influencing the development of rural tourism in the Ordos through gray correlation analysis, 11 indicators were constructed from three factors, namely, economic, ecological environment, and social, to evaluate the development of rural tourism in the Ordos. By calculating the gray correlation degree of 11 indicators, the correlation degree of the ecological environment factor is the highest, the correlation degree of the social factor is the second, and the correlation degree of the economic factor is the lowest.

6 Development path of rural tourism in ordos

6.1 Improve rural tourism development system

By establishing a green tourism monitoring system, the development of rural tourism cannot be separated from a sound development system. [2] The social-environmental capacity, ecological environmental capacity, and capacity of reception facilities are measured for various types of tourist attractions in the rural Ordos to ensure that the quality of tourism and environmental quality are improved simultaneously.

The establishment of a green certification system for rural tourism enterprises is an important guarantee for the development of rural tourism. Guide relevant enterprises to implement green standards, such as rural tourism green scenic spots, green buildings, green B&B, green products, and other certifications.

6.2 Design rural tourism products

Follow the principles of green ecology and regional characteristics, integrate cultural and creative concepts, models, and wisdom into rural tourism development, use cultural innovation and product development models, combine green ecology, traditional culture, agricultural industry, and folk customs and folkways in rural tourism, develop leisure tourism products to meet the diversified and personalized needs of consumers.

Relying on ecological resources, develop and design low-consumption, zero-pollution green tourism products. Emphasis on the promotion of recreation and vacation type, sports and leisure type rural tourism products. [3]

6.3 Advocate green consumption and marketing in villages

Lead green consumption and practice green consumption. Ordos rural tourism should be led by green and healthy consumption. Follow the principle of protection, combine development and protection, and take the green road of sustainable development. Lead green development with the green concept, practice green consumption, strengthen green environment education for rural tourists, promote green culture, maintain ecological awareness, protection awareness, low-carbon awareness, and environmental awareness.[4]

Strengthen green marketing. Make full use of the advantages of the Internet to improve the intelligent service system of rural tourism in the Ordos. Develop APP, realize the full coverage of media channels, visitors can know and promote Ordos rural tourism through APP, the official account of WeChat, short video, microblog, official website, etc. [5]

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