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Research on the competitiveness of tourism destinations based on input-output efficiency analysis

——Take 18 cities in Henan province as an example

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Abstract: This paper studies the competitiveness of tourism destinations in 18 cities in Henan province, and the degree of tourism competitiveness is described by the input-output efficiency of tourism destinations. Through 18 cities input-output index construction, data collection and data processing for comprehensive analysis, it is concluded that 18 cities in Henan tourism destination competitiveness strength level is divided into five levels of Luoyang and Kaifeng tourism competitiveness is strong, Jiaozuo tourism competitiveness is strong, Sanmenxia, Zhumadian, Zhengzhou city tourism competitiveness is medium, Zhoukou, Anyang, the six city competitiveness is weak, luohe city, Xinyang four city tourism competitiveness is weak, and according to the data analysis results put forward some constructive and feasible Suggestions.

Keywords: Tourist Destination Competitiveness, Input-output Efficiency, Henan

1.Introduction

Due to the epidemic, the tourism industry across the country has been greatly affected. However, under the joint efforts of local governments and relevant personnel, the tourism industry across the country is constantly recovering and gradually entering the normal track. Similarly, the tourism industry in Henan has gradually improved. By the end of 2021, the total tourism revenue in Henan had reached 607.9 billion yuan, recovering to 63% of the pre-epidemic level, and received 790 million tourists. At present, the tourism economy has recovered to 88% of [1] in 2019. The tourism development of Henan province is still in a medium position in the whole country, but it is a long way to transform Henan province from a “province with large tourism resources” to a “province with strong tourism resources”.

The development of tourism in tourism destinations needs the investment of various tourism resources. If there is no effective data as a reference, the investment scale and decision direction of various tourism destinations will become a major problem faced by tourism developers. This paper by measuring the resource input and output of 18 cities in Henan, and identify the efficiency of resource efficiency, is beneficial to grasp the overall development status and trend of tourism in Henan province, find out the advantages and disadvantages of the tourist destination competitiveness, to optimize the tourist destination of capital, resources and human allocation, avoid repetitive construction, and put forward some constructive and feasible Suggestions according to the data analysis results.

2.Literature review

At present, the research on the competitiveness of tourism destinations mainly focuses on the influencing factors of the competitiveness, evaluation model and index construction. On the research aspects of the factors influencing the competitiveness of tourist destinations, Lirong Yi et al[2]Using a correlation analysis method,Xucai Wan et al[3]Use the survey method,Chunyang Wang et al. [4] used the structural equation model、 Meilin Chen [5] et al Using the Delphi method and the mathematical statistics method,Longlong Xu et al[6] studied the influencing factors based on tourist perception;As for the evaluation model and index system construction, Minting Huang et al. [7] used the factor analysis method to empower the constructed indicators,Principal component analysis and cluster analysis were used by Xianfeng Wang [8] et al,Yuqian Sun [9] et al. used the measurement analysis method.

In short, China has made some achievements in the research of tourism destination competitiveness, but there are still some deficiencies. In terms of research methods, the evaluation of tourism destination competitiveness from input-output economics is relatively few, the tourism destination is analyzed from a certain country or a single region. Therefore, this paper takes 18 cities in Henan province as the re-

search object, studies the input-output efficiency of tourism destinations from the perspective of economics, and then makes a comprehensive evaluation of the competitiveness of tourism destinations in 18 cities in Henan Province.The index selection, index empowerment method and the evaluation perspective of tourism destination competitiveness are the characteristics and innovation points of this paper.

3.Study design

3.1 Data source

Due to the impact of the epidemic in 2020, in order to ensure the timeliness and authenticity of the data, this paper selects the tourism data of 2019, the data are from the [1] of Henan Statistical Yearbook 2020, the statistics of tourism economic status of Henan Province published on the website of the Ministry of Culture and Tourism and the websites of municipal governments.

3.2 Index Construction

This paper constructs 4 input first-level indexes, including 10 second-level indicators; 3 output first-level indexes, including 5 second-level indicators. The evaluation index system of tourism destination competitiveness based on the input and output model is shown in (Table 1)as follows:

Table 1.Construct the evaluation index system of the competitiveness of the tourism destination with the input and output model

	essential factor	metric	variable	weight
Input composite index X	resource endowment	Number of A-level tourist attractions (A)	X1	α1
		Tourism resource density	X2	α2
	capital	Share of fixed assets in the tertiary industry (percentage)	X3	α3
		Number of star hotels (a)	X4	α4
		Number of travel agencies (a)	X5	α5
	human resources	Number of catering and accommodation employees (individual)	X6	α4
		Number of institutions of higher learning (a)	X7	α7
		Number of students enrolled in institutions of higher learning (one)	X8	α8
	Supporting facilities	Number of airports (s)	X9	α9
		Highway mileage (km)	X10	α10
Output composite index Y	Domestic tourism output	Domestic tourists (ten thousand people)	Y1	β1
		Domestic tourism revenue (100 million yuan)	Y2	β2
	International tourism output	Inbound tourists (ten thousand times)	Y3	β3
		Inbound tourism income (100 million yuan)	Y4	β4
	Output of tourism-related enterprises	Accommodation and catering business revenue (ten thousand yuan)	Y5	β5

3.3 Data processing method

In this paper, the input-output efficiency index of 18 cities is calculated by using the maximum element reference method and dispersion coefficient method and Excel tool, and then evaluates the competitiveness of various tourist destinations in Henan Province.

3.3.1 Maximum element reference method

The data of each index factor is treated dimensionless to eliminate the difference of each index unit for data processing:

$$X'_{ij} = \left(X_{ij} / \max_{1 \le i \le n}[X_{ij}]\right) \times 100 (j = 1,2,\cdots 10,\ n = 18) \quad (1)$$

$$Y'_{ik} = \left(Y_{ik} / \max_{1 \le i \le n}[Y_{ik}]\right) \times 100 (k = 1,2,\cdots 5,\ n = 18) \quad (2)$$

3.3.2 Discrete coefficient method

First, the mean $\overline{X_t}$ the mean and standard deviation S_j of each input index are calculated according to the sample data, and the coefficient of variation is V_j

$V_j = S_j / \bar{X}_j \quad (j = 1,2,\cdots 10)$(3)

Among them:

$\bar{X}_j = \sum_{j=1}^{n} X'_{ij}/n$ (Where n represents the number of samples) (4)

$S_j = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}\left(X'_{ij} - \bar{X}_j\right)^2}$ (j = 1,2,…10) (5)

After calculating the coefficient of variation, the weight valueof the corresponding index is:

$\alpha_j = V_j \Big/ \sum_{j=1}^{10} V_j$ （j = 1， 2,… … ,10）(6)

For the output index of tourist destination elements, the calculation method is similar. According to the sample data, the mean $\overline{Y_k}$and standard deviation S_k are calculated according to the sample data, then the coefficient of variation V_k is calculated, and finally the weight β_k is determined:

$V_k = S_k/\bar{Y}_k$ （k = 1， 2,…,5）(7)

Among them:

$\overline{Y_k} = \sum_{k=1}^{n} Y'_{ik}/n$ （其中 n 表示样本个数） （8）

$S_k = \sqrt{\frac{1}{n-1}\sum_{k=1}^{n}(Y'_{ik} - \bar{Y}_k)^2}$ (k = 1,2,…5) (9)

Then, after standardization processing, the corresponding exponential weight β_k:

$\beta_k = V_k \Big/ \sum_{k=1}^{5} V_k \left(k = 1， 2， \ldots,5\right)$ (10)

3.3.3 Calculation of input-output efficiency index E-value

Tourism destination is a comprehensive system, under a certain input, will get a certain output, the two have the following functional relationship:

$Y = f(x_1, x_2, \cdots x_n)$ (11)

Among them, Y represents the output of the tourist destination, and x_n is each input factor.

In the study of this paper, the input and output efficiency are used to measure the competitiveness of each tourist destination. The higher the input-output efficiency indicates that the higher the effectiveness of the tourism resources and the stronger the competitiveness; otherwise, the lower the input-output efficiency, the lower, the effectiveness of the competitiveness. Therefore, the above weight and data processing methods are used to calculate the tourism destination input composite index X and the output composite index Y, and the calculation formula is as follows:

$X = \sum_{j=1}^{10} \alpha_j x_j \left(\mathrm{j} = 1， 2， \ldots,10\right)$ (12)

$Y = \sum_{k=1}^{5} \beta_k y_k \left(\mathrm{k} = 1， 2， \ldots,5\right)$ (13)

$$E = Y/X \quad (14)$$

4. Comprehensive input-output analysis of tourism destination competitiveness in Henan Province

Based on the empowerment calculation of the input and output composite index of each tourist destination, the E value of the input-output efficiency index is calculated according to the formula E=Y / X.According to the input and output efficiency index of each region, it can be divided into five levels: Strong（$E > 1.5$), strong（$1 < E < 1.5$）, medium（$0.6 < E < 1$）, weak（$0.3 < E < 0.6$）, and weak（$0 < E < 0.3$）[10]. The competitiveness level of 18 cities in Henan Province is shown in (Table 2) below:

Table 2.Henan province 18 cities tourism destination competitiveness strength level

Input-output efficiency index E	Input-output efficiency index hierarchy range	travel destination	Competitiveness level
Economy of Scale (E 1)	Level 1 (E> 1.5)	Luoyang city and Kaifeng cities	stubborn
	Level 2 (1 <E <1.5)	Jiaozuo City	stronger
No economies of scale (E <1)	Level 3 (0.6 <E <1)	Sanmenxia City, Zhumadian City, Zhengzhou City, Puyang City, Xinxiang City	secondary
	Tier 4 (0.3 <E <0.6)	Zhoukou, Anyang, Pingdingshan, Shangqiu, Xuchang, Jiyuan	relatively weak
	Level 5 (0 <E <0.3)	Luohe City, Xinyang City, Hebi City, Nanyang City	weak

It can be concluded that the tourist destination competitiveness level in the strong above basic performance has relatively rich tourism resources, is given priority to with capital investment and human resources, supporting facilities complementary input structure characteristics, play their own advantages and reasonable use of the input elements, to obtain higher competitiveness level of tourism destination.

5. Conclusion

Through data analysis, the competitiveness level of tourism destinations in Henan province can be divided into five levels: strong, strong, medium, weak and weak. Among them, the tourism development of Luoyang, Kaifeng and Jiaozuo shows the economy of scale, and the tourism competitiveness level is strong and strong respectively. However, the other cities are uneconomical in scale, among which Sanmenxia and Zhengzhou are medium, Zhoukou and Anyang are weak, and Luohe, Xinyang and Nanyang are weak. Based on the above conclusions, the following suggestions are drawn: ① Reasonably increase the input scale of local factor input to promote the high-quality development of tourism; ② continuously optimize the allocation of factor input resources to maximize output and improve the competitiveness of tourism destinations; ③ establish tourism brand, increase publicity, enhance tourism image, enhance the attraction of tourist destinations and increase tourism output.

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