

Research on Jiangxi City Tourism Competitiveness based on Comprehensive Fuzzy Evaluation Method

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Abstract. Accelerating the Jiangxi Province tourism construction has great significance on social and economic development of Jiangxi. As insufficient in current evaluation system of tourism competitiveness system and lack of tourism province evaluation index system and method of academic research, this study proposes a research method based on fuzzy comprehensive evaluation of Jiangxi province city tourism competitiveness, and based on the 11 cities tourism competitiveness evaluation of Jiangxi tourist to establish comprehensive fuzzy evaluation factor and weight matrix, finally the strongest competition of city is got. Finally, the paper uses radar map to analyze the factors of influencing the city tourism competitiveness, which has important theoretical and practical significance to promote Jiangxi Province tourism construction services.

Introduction

In the strong tourism theory research, there are two form of paradigms: one is from the basic connotation of the world tourism power, exploring the full range of strong conditions and index system of strong province; another is based on the tourism satellite account (TSA), from the tourism economic indicators to talk about the strong travel province. Neither of the two methods has got a compelling tourism province concept and index system. The research is based on the competitiveness evaluation of Jiangxi 11 tourism cities as the breakthrough point, and the comprehensive fuzzy evaluation method is introduced to the evaluation of urban tourism competitiveness, which has important practical significance on competitiveness of tourism concept and index system establishment.

The Basic Comprehensive Fuzzy Evaluation Process of of Jiangxi Urban Tourism Competitiveness

By using the comprehensive fuzzy evaluation method, the theory of regional tourism competitiveness can be applied to the analysis of practical problems. The basic process of Jiangxi urban tourism competitiveness fuzzy evaluation includes competitiveness model establishment, the determination of index system and weight coefficient, comprehensive analysis of data processing and results evaluation, so as to determine the tourism competitiveness of 11 cities of Jiangxi [1, 2]. According to the evaluation results, the corresponding measures can be put forward based on the advantages and disadvantages existing in the development of tourism.

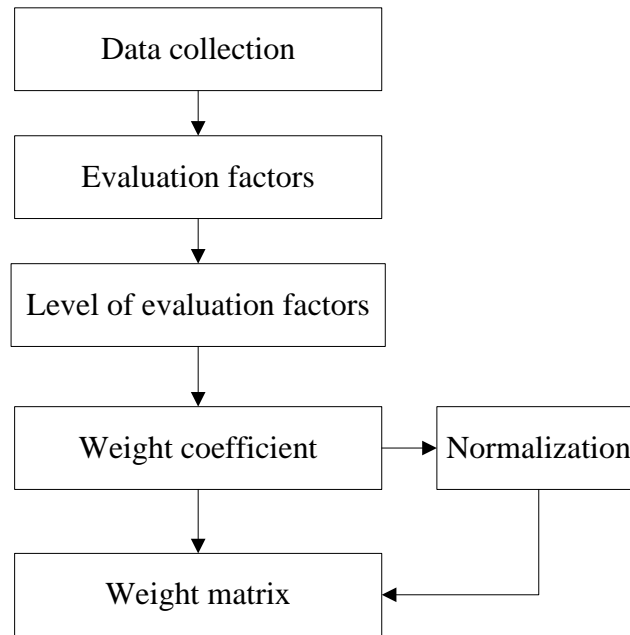


Fig.1 Evaluation process of tourism competitiveness

Figure 1 shows the tourism competitiveness evaluation process based on comprehensive fuzzy evaluation method. First of all it establishes hierarchy of evaluation factors and evaluation factors, and then determines the weight coefficient of each evaluation factor, weight matrix is obtained by normalization processing, finally according to membership function to determine the level of evaluation and complete fuzzy comprehensive evaluation process.

The Mathematical Model of Fuzzy Comprehensive Evaluation Method for Tourism Industry

Fuzzy comprehensive evaluation method is developed on the basis of fuzzy mathematics, and comprehensive fuzzy evaluation is mainly composed of three parts, including the evaluation factors, the value and weight. The evaluation factors is to divide the evaluation project, which is divided into primary evaluation factors, secondary evaluation factors and multilevel evaluation factors, each evaluation factor is correspond to one evaluation. This value can be obtained by experience or expert scoring; another important part is the weight [3- 5]. Weight refers to the importance of the evaluation factors in all the conditions of participation. The sum of the weight is 1.

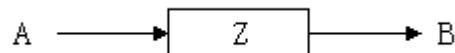


Fig.2 Schematic diagram of comprehensive fuzzy evaluation process

Figure 2 shows the schematic diagram of comprehensive fuzzy evaluation process. A represents evaluation factor matrix, B represents the results of comprehensive fuzzy evaluation, Z represents the weight coefficient. Comprehensive fuzzy evaluation results are calculated by $A * Z = B$. Comprehensive fuzzy evaluation is mainly divided into four steps, the first is the evaluation factors and levels of determination, and then the membership degree and weight calculation, and finally carries on the comprehensive fuzzy evaluation, the steps are as follows:

Evaluation factor set and level determination. In the model it determines an evaluation factor set and level set. If the evaluation factor is $V = \{v_1, v_2, \dots, v_n\}$, and v_i is in the evaluation factors in the evaluation factor collection. In Jiangxi province city tourism competitiveness analysis and evaluation, the evaluation factors are divided into the performance of the tourism, tourism scale and other indicators. Each factor set includes the multiple categories, level is divided into three levels, each category is corresponding to a weight, and these weights constitute the fuzzy evaluation matrix.

Determine the degree of membership. Membership is one of the most important link in the comprehensive fuzzy evaluation, its value is in the interval of $[0,1]$. Of course it can also determine the level and the fuzzy boundary by the form of membership function. In the tourism competitiveness

evaluation of Jiangxi Province, this study uses the trapezoidal formula to determine the membership degree.

Highly competitiveness:

$$Y_1 = \begin{cases} 1 & x \leq S_1 \\ \frac{S_2 - x}{S_2 - S_1} & S_1 \leq x \leq S_2 \\ 0 & S_2 \leq x \end{cases} \quad (1)$$

Higher competitiveness:

$$Y_2 = \begin{cases} \frac{x - S_1}{S_2 - S_1} & S_1 \leq x \leq S_2 \\ \frac{S_3 - x}{S_3 - S_2} & S_2 \leq x \leq S_3 \\ 0 & x < S_1, x > S_3 \end{cases} \quad (2)$$

General competitiveness:

$$Y_3 = \begin{cases} \frac{x - S_2}{S_3 - S_2} & S_2 \leq x \leq S_3 \\ \frac{S_4 - x}{S_4 - S_3} & S_3 \leq x \leq S_4 \\ 0 & x < S_2, x > S_4 \end{cases} \quad (3)$$

Lower competitiveness:

$$Y_4 = \begin{cases} 0 & x \leq S_3 \\ \frac{x - S_3}{S_4 - S_3} & S_3 \leq x \leq S_4 \\ 1 & x > S_4 \end{cases} \quad (4)$$

Among them, x is the actual value of the evaluation factor, S_1, S_2, S_3, S_4 are the threshold value of the i evaluation factor.

Determine weight. The weights of various evaluation factors are different, and the calculation formula is as follows:

$$W = \frac{C}{S'} \quad (5)$$

Among them, W is the weight of evaluation factors, C is the initial value of evaluation factors, S' is average value of the evaluation factors at all levels. After normalizing the weight of each evaluation factor, the weight matrix can be obtained.

$$\vec{A} = [W_1, W_2, W_3, W_4, W_5, W_6] \quad (6)$$

Among them, W_i indicates the impact of a rating factor on a certain level.

Fuzzy comprehensive evaluation. After the membership degree of the evaluation factors are obtained, the fuzzy relation matrix can be obtained as \vec{B} .

$$\vec{B} = \vec{A} \times \vec{R} \quad (7)$$

\bar{R} is the matrix of the main competitive factors, and the value can be obtained through the expert experience and consulting data. The evaluation results can be used the classification of membership degree to view the final evaluation level, completing the comprehensive fuzzy evaluation

Comprehensive Fuzzy Evaluation of Urban Tourism Competitiveness in Jiangxi

This study uses Jiangxi province tourism construction as the breakthrough point to do fuzzy comprehensive tourism competitiveness evaluation on 11 cities of Jiangxi province [6, 7, 8]. The eleven cities mainly includes Nanchang, Jiujiang, Jingdezhen, Pingxiang, Ganzhou, Xinyu, Yingtang, Shangrao, Fuzhou, Ji'an, Yichun, the comprehensive fuzzy evaluation indicators are such as Table 1.

Table 1. Comprehensive fuzzy evaluation index of tourism competitiveness

First level evaluation index	Weight	Second level evaluation index	Weight
Tourism scale	0.4	D1 domestic tourism revenue	0.12
		D2 tourism foreign exchange earnings	0.11
		D3 host the number of tourists	0.13
		D4 numb of trips	0.15
Tourism performance	0.4	D5 tourism GDP contribution rate	0.12
		D6 tourism employment contribution rate	0.08
		D7 per capita travel cost	0.06
		D8 per capita stay	0.03
		D9 tourism investment multiplier	0.02
		D10 return on net assets of tourism enterprises	0.11
Other indicators	0.2	D11 the total proportion of individual tourists	0.05
		D12 total expenditure for tourists	0.02
		D13 industry concentration	0.01

Table 1 indicates the comprehensive fuzzy evaluation index of tourism competitiveness, the evaluation index is divided into three levels: the first level is the scale of tourism, tourism performance and other indicators, the second level indicators is divided into eleven and each one needs the expert scoring. By playing, the city score results are got as shown in Table 2.

Table 2. Expert scoring for turism competitiveness index

Index	Nan Chang	Jiu Jiang	Jing Dezhen	Ping Xiang	Gan Zhou	Xin Yu	Ying Tan	Shang Rao	Fu Zhou	Ji An	Yi Chun
1	0.12	0.25	0.13	0.22	0.11	0.08	0.12	0.13	0.25	0.12	0.35
2	0.11	0.06	0.08	0.02	0.01	0.03	0.04	0.06	0.08	0.11	0.13
3	0.13	0.11	0.12	0.09	0.02	0.04	0.05	0.05	0.11	0.22	0.16
4	0.22	0.13	0.25	0.12	0.11	0.24	0.26	0.28	0.33	0.12	0.36
5	0.11	0.23	0.12	0.13	0.15	0.18	0.17	0.16	0.18	0.12	0.38
6	0.06	0.03	0.03	0.01	0.01	0.02	0.03	0.01	0.01	0.08	0.09
7	0.22	0.21	0.23	0.12	0.10	0.12	0.15	0.16	0.27	0.18	0.08
8	0.12	0.11	0.013	0.05	0.06	0.08	0.09	0.07	0.04	0.01	0.12
9	0.11	0.12	0.011	0.01	0.02	0.03	0.05	0.08	0.09	0.12	0.11
10	0.02	0.05	0.06	0.07	0.04	0.05	0.07	0.08	0.09	0.11	0.23
11	0.01	0.02	0.03	0.05	0.08	0.01	0.03	0.02	0.05	0.08	0.18

Finally through the comprehensive fuzzy evaluation results, it is found that Jingdezhen comprehensive score is the highest with the strongest tourism competitiveness; the second is the Nanchang City, the third is Pingxiang and other cities are Jiujiang, Ganzhou, Xinyu, Yingtang, Shangrao, Fuzhou, Ji An, Yichun. In order to further study the tourism development of Jingdezhen City, radar chart tourism competitiveness is drawn in Figure 2.

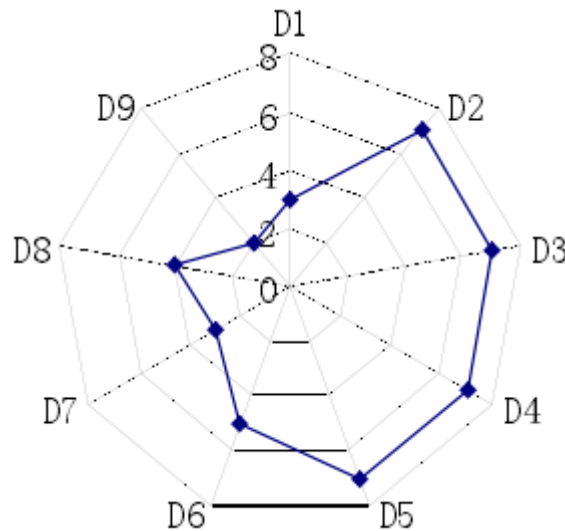


Fig.3 Jingdezhen tourism competitiveness index radar chart

From Figure 3, it can be seen that the three indicators reflecting the size of tourism of rank lower, but higher income of domestic tourism, ranking third. The remaining two are at a disadvantage, tourism performance index row is in the forefront, including three secondary indicators: tourism's GDP rate, tourism employment contribution rate and per capita tourist spending [9, 10]. It means the city scale is an important factor to restrict the development of urban tourism, so in the subsequent process of tourism development, it need to focus on considering this factor.

Discussion on the Countermeasures of Improving the Competitiveness of Tourism in Jiangxi

Based on the analysis of Jiangxi city tourism competitiveness, the countermeasures to enhance the tourism competitiveness of Jiangxi are summarized, including the following three points:

Innovative travel to achieve ultra conventional development. In order to promote the development of the tourism industry in Jiangxi province, it needs the innovation of tourism industry to provide system that would guide the tourism scenic spots and tourist enterprises to market and brand [11, 12]. Advance the tourist resources and the industrial integration of management, the scenic area management rights, management rights and ownership separation are separated, forming a virtuous circle of mutual supervision, carry out their duties, common win, so that promote the overall management level of scenic spots.

Resources integration to strengthen the construction of famous scenic spots. The Jiangxi province has beautiful scenery and pleasant scenery tourist resources, transforming it into the tourism industry and economic advantages, using tourism and leisure resort for the overall positioning, red cradle and green homes as the overall image, fully integrating a variety of tourism resources as red classics, ceramic art, historical culture and local customs, etc, optimizing tourism spatial and scientific planning urban urban and scenic spots.

Innovative tourism enterprise concept, enhance the competitiveness of tourism market. The core of tourism enterprises' regional tourism represents the degree of tourism development in a region. Compared with other tourist cities in China, there is still a big gap between the experience and ideas of the tourism city in Jiangxi province. Therefore, Jiangxi government departments should actively guide tourism enterprises management experience, through a variety of incentives to stimulate the tourism enterprises, at the same time the tourism enterprises should promote the innovative ideas together to enhance the regional tourism competitiveness.

Summary

This study adopts comprehensive fuzzy evaluation method to evaluate the tourism competitiveness of the 11 cities in Jiangxi province, and sets up the comprehensive fuzzy evaluation factor set. It has 11 indicators to determine the weight coefficient of each index. Through the

calculation 11 cities of Jiangxi Province tourism competitiveness evaluation results have been got, and using radar chart to analyze the affecting factors, which has important practical significance on the construction strategies and methods of Jiangxi province tourism research.

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