Advances in Social Science, Education and Humanities Research, Volume 496
Proceedings of the 2020 3rd International Conference on Humanities Education and Social Sciences (ICHESS 2020)

Study on the Influencing Factors of Yichun Tourism Competitiveness by the Principal Component Analysis

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ABSTRACT
Principal component analysis was used to research the main influencing factors of tourism competitiveness of Yichun. Results showed that the main factors affecting the tourism competitiveness of Yichun are as follows: (1) the number of overseas tourists (the loading in the eigenvector variables T1 is highest, with 0.275); (2) the number of employees in accommodation and catering industry above designated scale at the end of the period (the loading in T2 is highest, with 0.353); (3) sunny days in a year (the loading in T3 is highest, with 0.480); and (4) passenger turnover (the loading in the eigenvector variables T4 is highest, with 0.529). To promote the development of Yichun's tourism and its competitiveness, we recommended some suggestions on the aspects of promoting international reputation of tourism and upgrading tourism service, optimizing ecological environment, and perfecting the transportation infrastructure, etc.
Keywords: *Yichun; Principal component analysis; Tourism competitiveness; Influencing factors*

1. INTRODUCTION

The competitiveness of urban tourism is a comprehensive ability whereby cities can rely on its own resources to promote the optimal development of society and economy, environment in economic activities [1]. The economic situation of many cities is better off than before by developing tourism, including Yichun. It can be found from the official statistics of Yichun in 2017, and 2018 that the GDP in 2017 increased by 9% compared with 2016, among which the growth rate of service industry was the highest, with a yearly growth of 11.3%. Moreover, Yichun is an important member of the urban agglomeration in the middle reaches of the Yangtze River, with obvious geographical advantages. For example, due to the good ecological environment, profound cultural heritage, rich hot spring resources, and friendly policy of the provincial and municipal government, Yichun's tourism has been developing steadily. However, the construction of tourism-related facilities is not strong, and the international reputation of tourism products is still small, which restricts the promotion of tourism competitiveness of Yichun. Thus, we set an assessment index system for tourism competitiveness to find accurately the main influencing factors, and put forward some suggestions for optimizing this competitiveness in this paper.

2. CONSTRUCTION OF EVALUATION INDEX SYSTEM AND RESEARCH METHOD

Previously, the research on the tourism competitiveness of Yichun mostly focused on rating the quality of tourism resources and the enrichment of tourism products [2]. So, it is innovative that we construct the assessment index system from two aspects of tourism competitive potential and tourism competitive performance [3] in this paper, as shown in Table 1. In addition, we use the principal component analysis to quantitatively research the index result of Yichun from 2010 to 2017, and comprehensively identify the main influencing factors of tourism competitiveness.

Table 1 Evaluation index system of Yichun's tourism competitiveness

Primary index	Secondary index	Third level index	Code
Tourism competition	Conditions of tourism	Number of national 4A and above scenic spots	X1

potential	resources		
	Infrastructure	Number of railway stations	X2
		Passenger turnover	X3
		Number of beds	X4
		Total post and telecommunications business	X5
		Number of employees in catering and accommodation industry above designated scale at the end of studied period	X6
		Number of star-hotels	X7
		Registered number of catering accommodation corporation above designated scale	X8
	Natural environment	Sunshine days in a year	X9
		Days with good air quality and above in the whole year	X10
		Green coverage area (whole Yichun City)	X11
		Number of severe weather disasters in the whole year	X12
	Economic environment	GDP (100 million yuan)	X13
		Urban per capita disposable income (yuan)	X14
Tourism competition performance	Development scale	Number of overseas tourists (10000 person times)	X15
		Inbound tourism revenue (10000 dollars)	X16
		Number of domestic tourists (10000 person times)	X17
		Domestic tourism revenue (10000 dollars)	X18

3. RESULTS

The results of principal component analysis are indicated in Table 2, Table 3 and Figure 1 by using SPSS 21.0. The eigenvalues of the four principal components in Table 2 are greater than 0.5, which are 12.937, 2.525, 1.276 and 0.723, respectively. The contributing rate of cumulative variance is more than 95%, which means the four principal components cover 97.002% original indicator's information and their ability to explain tourism competitiveness of Yichun exceeding 95% (97.002% are attained).

It can be known from Figure 1 that the line between factor 1, factor 2, factor 3 and factor 4 is relatively steep and the difference is quite large, which indicates that those four factors are of greater importance. Therefore, it is appropriate to select the four factors.

Table 2 Total variance explained

Component	Initial eigenvalues			Extract sums of squares loading			Rotate sums of squares loading		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	12.937	71.871	71.871	12.937	71.871	71.871	10.185	56.582	56.582
2	2.525	14.026	85.897	2.525	14.026	85.897	3.150	17.503	74.085
3	1.276	7.087	92.985	1.276	7.087	92.985	2.208	12.269	86.354
4	0.723	4.017	97.002	0.723	4.017	97.002	1.917	10.648	97.002

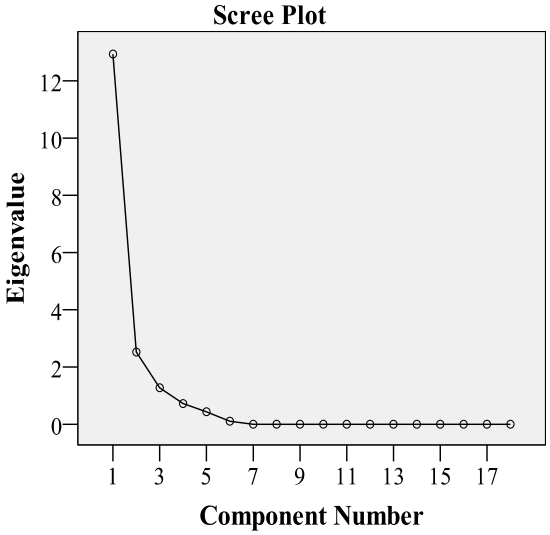

Figure 1 Eigenvalues scree plot

In this work, the factor data from the initial loading matrix are entered into the software SPSS 21.0. Then we got four variables named A1, A2, A3 and A4. The eigenvariables of T1, T2, T3 and T4 are, in turn, computed. However, in this paper, the main purpose of principal component analysis is to identify several principal components that can represent the tourism competitiveness of Yichun, and the data with high loadings on each principal component through principal component expressions, so as to confirm the determining variables on each principal component [4].

It can be seen from the eigenvector matrix that the loading of X15, X6, X9 and X3 in the eigenvector variables T1, T2, T3 and T4 were basically the highest, respectively (Table 3). Thus, the number of overseas tourists, the number of employees in accommodation and catering industry above designated scale at the end of studied period, sunny days in a year, and passenger turnovers are the major influencing factors of Yichun's tourism competitiveness.

Table 3 Eigenvector matrix

	T1	T2	T3	T4
X1	0.268	-0.072	-0.119	-0.058
X2	0.232	-0.245	0.164	-0.338
X3	-0.223	0.205	-0.020	**0.529**
X4	0.267	-0.008	0.208	0.167
X5	0.268	0.120	-0.092	0.112
X6	0.193	**0.353**	-0.194	-0.220
X7	0.081	-0.553	0.297	-0.012
X8	0.242	0.301	-0.056	-0.039
X9	-0.145	0.327	**0.480**	0.345
X10	-0.236	0.044	0.424	-0.215
X11	0.258	-0.110	0.269	0.143
X12	0.130	-0.371	-0.430	0.489
X13	0.274	0.012	0.132	0.073
X14	0.233	-0.104	0.289	0.270
X15	**0.275**	0.084	0.022	0.035
X16	0.271	0.126	0.069	0.066
X17	0.262	0.201	0.059	-0.041
X18	0.267	0.155	-0.009	-0.042

4. CONCLUSIONS AND SUGGESTIONS

Principal component analysis was used to research the main influencing factors of tourism competitiveness of Yichun. Results showed the main factors affecting the tourism competitiveness of Yichun are: (1) the number of overseas tourists (the loading in the eigenvector variables T1 is highest, with 0.275); (2) the number of employees in accommodation and catering industry above designated scale at the end of the period (the loading in T2 is highest, with 0.353); (3) sunny days in a year (the loading in T3 is highest, with 0.480); and (4) passenger turnovers (the loading in the eigenvector variables T4 is highest, with 0.529).

So, it is necessary to solve a series of problems to enhance Yichun's tourism competitiveness. For example, we should integrate and strengthen the advantages of regional tourism resources, improve the overall service level to attract more and more tourists. Then, we should resolve the problems of the low level of development of the accommodation and catering industry as well as the inadequate construction of transportation and other infrastructure. Third, the investment in infrastructure construction should be increased to create a good social and economic environment for tourism. The related administration should continue to intensify ecological and environmental protection and promote the development of low-carbon, ecological tourism. Last but not least, we should attract the tourists to increase the consumption capacity by the various sales skills and methods, so as to increase the passenger traffic turnover and gross tourism income.

ACKNOWLEDGMENT

We are very grateful for the financial support provided by the Research Project of Humanities and Social Sciences in Jiangxi's Universities (Grant No. GL19225) and Chinese National Science Foundation (Grant No. 71473113).

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