Analysis of Ecotourism Competitiveness in Mountainous Areas - A Case Study of Xichang in China

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Abstract. Eco-tourism competitiveness of southwestern mountainous area is the key point of the construction of mountain ecological culture. Taking Xichang city as the research area, the statistical data from 2008 to 2017 were selected, and 12 indicators were selected from four aspects of tourism resource competitiveness (TRC), tourism constitutes competitiveness (TCC), tourism infrastructure competitiveness (TIC) and tourism social competitiveness (TSC), to build Xichang ecotourism competitiveness (ETC) evaluation index system. The index weight was calculated using Mean Square Deviation and the ecotourism competitiveness was calculated by linear weighting method. The results showed that : (1) the ETC of Xichang city had been strengthened during last decade; (2) the TCC, TIC and TRC in Xichang had been continuously improved in the past ten years; (3) During last decade, Xichang's TRC had only been strengthened since 2014. To better enhance the ETC of Xichang mountain city, the utility of tourism resources should be explored and enhanced continuously in the future, to promote the construction of ecological civilization in mountainous areas of southwest China.

Keywords: Tourism competitiveness; Ecological tourism; Southwest mountain; Xichang City.

1. Introduction

With the rapid development of mountain ecotourism, tourism competitiveness has caught the attention of many researchers (Carayannis E G *et al.,* 2018). The competitiveness assessment first been summarized in tourist destinations (Shi *et al.,* 2006). The competitiveness of ecotourism clusters been considered in Yunnan nature reserves (Long, 2006). Ecotourism destination competitiveness has been reviewed by the evaluation index system (Huang *et al.,* 2011). Competitiveness has been analyzed in China's desert eco-tourism resources (Dong *et al.,* 2013). An evaluation index system, for the first time, constructed for the ecological health of mountain tourism in southwest China (Wu *et al.,* 2019). The diamond model is used to examine the eco-tourism competitiveness in Jiangxi forest park (Zhang, 2014). The eco-tourism competitiveness compared to Sichuan province and surrounding areas of Sichuan province (He, 2015). Overall, the above ecotourism competitiveness not only enriched the ecotourism theory but also boosted the great process of poverty alleviation in China's region-wide tourism. However, these studies still lack attention to the southwest mountain tourism region, especially the southwest mountain ethnic areas of ecotourism competitiveness research are still relatively lacking. This paper took Xichang as the research area, which was a livable zone in southwest China, analyzed the ecotourism competitiveness, and was compatible with the sustainable development of Xichang and southwestern mountain ecotourism.

2. Study Area

As the capital of Liangshan Yi autonomous prefecture, Xichang city (101°46 'E ~ 102°25 'E, 27°32 'N ~ 28°10 'N) is placed in the Anning river valley in southwest Sichuan province. The whole area is 2,651 km². The middle mountain area occupies 78.9% of the whole areas, the average altitude is above 1,500 meters. It is well known as the "Small Spring City" because of tropical plateau monsoon climate. By the end of 2017, the total permanent resident population was 777,200, and the

urbanization rate was 58.92 %. As an important node city of Sichuan and Yunnan, it is an important corridor of the southern silk road in the Southwest of China.

3. Methods

3.1 Evalution Index System

Considering the availability of data and the feasibility of assessment, this paper selected tourism resource competitiveness (TRC), tourism constitutes competitiveness (TCC), tourism infrastructure competitiveness (TIC) and tourism social competitiveness (TSC) four aspects, and then constructed the ecotourism competitiveness (ETC) evaluation system (See Table 1).

The TRC was represented by three evaluation indices. One index was tourism resource famous degree, which was calculated by the formula (tourism resource famous degree = World's biggest honor (2018-opening year) * 10 scores + Honor of national (2018-opening year) * 8 scores + Honor of province (2018-opening year) * 6 scores).The other index was the tourism resource level, which was calculated by the formula (tourism resource   level = world heritage * 10 scores/year + 5A level scenic spot * 8 scores/year + 4A level scenic spot * 6 scores/year + 3A level scenic spot * 4 scores /year + 2A and the following scenic spot * 2 scores/year). And the third index was tourism resource abundance, which was calculated by the formula (tourism resource abundance = number of tourism attractions + number of nature reserves + number of protections of cultural).

The TCC was expressed by three evaluation indices. One index was the proportion of tourism revenue in local GDP, the other index was the proportion of tourism revenue and primary industry, and third index was the proportion of tourism revenue and secondary industry.

The TIC included three evaluation indices. One index was the score of star hotels, which was calculated by the formula [the score of star hotels = 5 stars (2018-opening years) * 10 points + 4 stars (2018-opening years) * 8 points + under 3 stars (2018-opening years) * 6 points]. The other index was the total number of tourists, and third index was the number of travel agencies in a year.

The TSC included three indices. One was urban per capita disposable income, the other was rural per capita disposable income, and third was annual per capita tourism income.

Table 1. Evaluation index system and weight of eco-tourism competitiveness of Xichang city

Objective	Criterion	Index	Unit	Weight
Ecotourism Competitiv-eness (ETC)	Tourism Resource Competitiveness (TRC) 0.2633	Tourism resource famous	scores	0.0829
		Tourism resource level	scores	0.0907
		Tourism resource abundance	number	0.0897
	Tourism Constitutes Competitiveness (TCC)0.2411	Tourism revenue/local GDP	%	0.0858
		Tourism revenue/primary industry GDP	%	0.0837
		Tourism revenue/secondary industry GDP	%	0.0718
	Tourism Infrastructure Competitiveness (TIC)0.2519	Star degree hotels	scores	0.0917
		Total number of tourists received	people	0.0858
		Total number of travel agencies	number	0.0744
	Tourism Social Competitiveness (TSC)0.2437	Urban per capita disposable income	RMB/per	0.079
		Rural per capita disposable income	RMB/per	0.0834
		Annual per capita tourism income	RMB/per	0.0813

3.2 Data Standardization

All the data in this paper are from the bulletin of social and economic development of Xichang (2008-2018).

In this paper, range processing is adopted to eliminate the dimensionality of different data to realize 0-1 standardization of data. The calculation formula is as follows (1)-(2).

$$\text{Positive indicators,} \quad Y = \frac{x - x_{\min}}{x_{\max} - x_{\min}} \tag{1}$$

$$\text{Negative indicators,} \quad Y = \frac{x_{\max} - x}{x_{\max} - x_{\min}} \tag{2}$$

Where, X is the original value, $X_{\max}$ is the maximum value of this index, and $X_{\min}$ is the minimum value of this index.

3.3 Weight

Based on the actual situation of eco-tourism competitiveness in Xichang, this paper adopts the mean square deviation method of objective valuation method to calculate weight, and the specific calculation steps are as follows (3)-(5).

First, calculated the mean value of the j index $E(I_j)$.

$$E(I_j) = \frac{1}{n} \sum_{i=1}^{n} y_{ij} \tag{3}$$

Then, calculated the mean variance the j index $V(I_j)$.

$$V(I_j) = \sqrt{\frac{1}{n} \sum_{i=1}^{n} \left(y_{ij} - E(I_j)\right)^2} \tag{4}$$

Finally, calculated the weight coefficient W_j.

$$W_j = V(I_j) / \sum_{i=1}^{n} v(I_j) \tag{5}$$

3.4 Evaluation Method of Ecotourism Competitiveness

This paper adopts linear weighting function to evaluate the eco-tourism competitiveness, and the calculation formula is as follows (6).

$$T = \sum_{i=1}^{m} x_i w_i \tag{6}$$

Where, T is eco-tourism competitiveness, x_i is standardized value, and w_i is index weight.

3.5 Rating of Assessment

In this paper, eco-tourism competitiveness was divided into four grades: very weak (0.00, 0.29], weak (0.30-0.59), strong (0.60-0.79) and very strong (0.80-1.00).

4. Results and Analysis

According to the above calculation, the change of eco-tourism competitiveness of Xichang from 2008 to 2017 can be obtained (see Figure 1).
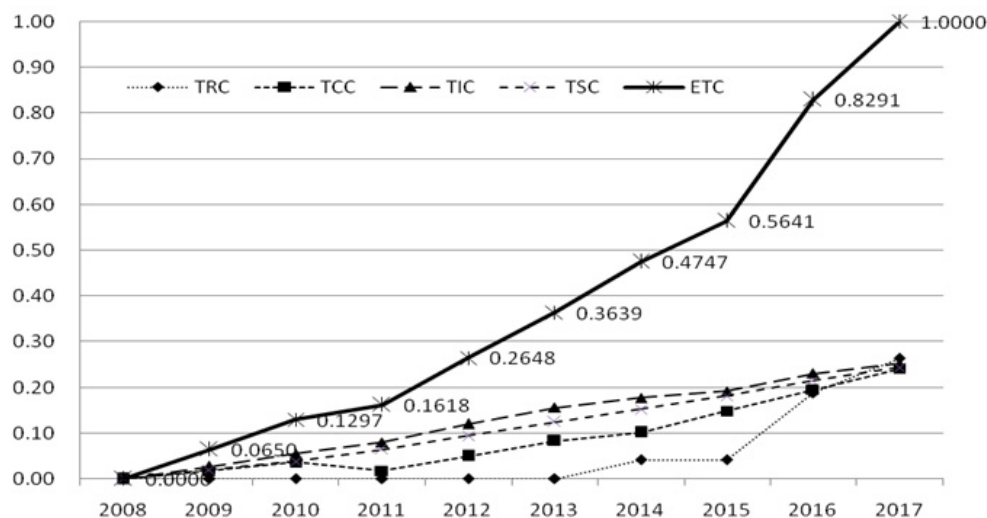

Fig. 1 Xichang eco-tourism competitiveness (2008-2017)

4.1 Eco-tourism Competitiveness (ETC)

Based on the research period of 2008, Xichang's ETC had been continuously enhanced from 2008 to 2017 (Figure 1). This enhancement trend was firstly influenced by the tourism resource level index (0.0907) in the TRC. In the past ten years, the number of national A-level scenic spots in Xichang had been increasing, which had improved the tourism resources level. Secondly, influenced by the tourism star hotel (0.0917) in the TIC, the number of tourism star hotels in Xichang in the past ten years had been increased, which had improved tourism reception capacity and promoted the TIC.

4.2 Tourism Resource Competitiveness (TRC)

Based on the study period of 2008, Xichang's TRC was characterized by stages change from 2008 to 2017 (Figure 1). From 2008 to 2013, Xichang's TRC was weak and stagnated (0.0000). The main reason was the case that in the past 6 years, the level of national A-level scenic spots and star-rated hotels had not changed. On the contrary, from 2014 to 2017, Xichang's TRC was continuously enhanced. This was mainly due to the increasing number of national A-level scenic spots and the continuous upgrading of star hotels.

4.3 Tourism Constitutes Competitiveness (TCC)

Based on the research period of 2008, Xichang's TCC had been continuously enhanced from 2008 to 2017, but all of them were in a weak state. In 2017, the TCC will be the strongest. This is mainly because the income of the tertiary industry represented by tourism accounts for a high proportion 51.67% of regional GDP. The proportion of primary industry and secondary industry in GDP was expected to be very low, accounting for 9.27% and 39.06% of GDP respectively in 2017.

4.4 Tourism Infrastructure Competitiveness (TIC)

Based on the study of 2008, Xichang's TIC had been continuously enhanced from 2008 to 2017, but all of them were in a weak state. In 2017, the TIC will be the strongest. In a word, although the number of star-rated hotels and travel agencies were increasing and the number of tourists received is also increasing. The overall tourism supporting competitiveness was still weak.

4.5 Tourism Social Competitiveness (TSC)

Based on the study of 2008, Xichang's TSC had been continuously enhanced from 2008 to 2017, but all of them were located in a weak state. In 2017, the TSC will be the strongest. Although the

rural per capita tourism income and per capita tourism income were increasing, the overall TSC in tourism areas was still weak.

4.6 Linear Regression Analysis of ETC

The software SPSS21.0 was used for linear regression analysis, and it was found that the linear regression of ETC and TRC, TCC, TIC and TSC were very significant (sig. = 0.000) (see Table 2).

Table 2. Linear regression analysis of ETC Anova[a]

Model	Sum of squares	df	Mean square error	F	Sig.
Regression	0.996	4	0.249	250919632.866	0.000[b]
Residual	0.000	5	0.000		
Total	0.996	9			

a. Dependent variable, ETC

b. Predictive variable: (constant), TRC, TCC, TIC and TSC.

Table 3. Linear regression coeffcient of ETC [a]

Model	Standard coefficient	t	Sig.
TRC	0.282	2916.071	0
TCC	0.247	1021.657	0
TIC	0.261	601.932	0
TSC	0.252	444.91	0

a. Dependent variable, ETC

According to the regression analysis in table 2 and the regression coefficient in table 3, the linear regression formula (7) of ecotourism competitiveness can be obtained.

$$ETC=0.282*TRC+0.247*TCC+0.261*TIC+0.252*TSC \tag{7}$$

5. Conclusion

5.1 The ETC was in a Growing Trend in the Past Ten Years

To maintain the sustainable ETC, it is necessary to continue to improve the service level of A-level scenic spots and star hotels in the future, to enhance the competitiveness of eco-tourism.

5.2 The TRC was in a Growing Trend in the Past Ten Years

On the whole, Xichang's TRC was weak in the past ten years. It should be made seriously and not taken lightly. In the future, managers should continue to enhance the level of resources and the abundance of tourism resources, and finally, improve the competitiveness of resources.

5.3 The TTC has been Continuously Enhanced in the Past Ten Years

Although TTC had been weak for 10 years, the proportion of tertiary industry led by tourism in GDP had been increasing. Therefore, in the future industrial structure adjustment process, managers should coordinate the proportion of three kinds of industry.

5.4 The TIC was in a Growing Trend in the Past Ten Years

Generally speaking, The TIC was in a weak state. In the future, managers will need to continue to increase the number of star-rated hotels and travel agencies and improve the service level, to enhance the competitiveness of tourism support.

5.5 The TSC has been Continuously Enhanced in the Past Ten Years

In this decade, the dividing line was 2013. Before 2013, the TSC was weak, while after 2013, the TSC was rapidly improved. In the future, rural per capita income and per capita tourism income should be constantly improved in the tourism industry, and to improve the TSC.

As the corridor city connecting Sichuan and Yunnan, the competitiveness of mountain eco-tourism in Xichang was related to the sustainable development of mountain tourism in southwest China. Therefore, the index system of Xichang mountain ecotourism competitiveness still needs to be further investigated in the future.

Acknowledgments

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