Construction of Evaluation System on Tourism Distributing Ability in Sanya City

—Based on the Analytic Hierarchy Process (AHP)

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Abstract: The evaluation system index of the tourism distributing center in Sanya is constructed, and the tourism distributing ability of Sanya is evaluated in the quantitative evaluation method and the analytic hierarchy process. The survey shows that the accessibility and comfort from the tourism distributing center to the tourism destination as well as the comfort of the local traffic in the tourism distributing center are taken as the most important factors for tourists to evaluate the tourism distributing ability of a region. As a tourism distributing center, Sanya city is still endowed with a relatively great promotion space in the aspect of the tourism distributing ability.

1. Introduction

Because of the geographical environment, the traffic condition and the distribution of tourism resources in Hainan Province, Sanya City has been taken as the first choice for tourism on the island in the early developing period of the tourism industry of Hainan Province. It is the most important tourism destination on Hainan Island. In recent years, Hainan Island has been promoted as an international tourism island. Lots of road resources such as the Island of Hainan Railway and the Expressway HAINAN have been developed and constructed. A series of measures, such as the deep development of tourism resources, have been taken in the eastern, western and central parts of Hainan Province. As a result, more and more tourists begin to choose some regions in the province except Sanya City for the deep tourism experience. Therefore, the status and role of Sanya City as a tourism distributing center begin to emerge.

In the research, as the goal level, the tourism distributing ability of Sanya City is decomposed. The indicators that affect the tourism distributing ability of Sanya City are quantitated and sorted in the AHP Method in order to understand the evaluation of tourists on the tourism distributing ability of the city.

2. Construction of Evaluation System on Tourism Distributing Ability

2.1 Determination of Basic Theories and Indexes

The Analytic Hierarchy Process (AHP) is a decision analysis method with the combination between the quantitative analysis and the qualitative analysis proposed by Saaty, an American operational research expert and professor from University of Pittsburgh (PITT), in the early 1970s.

In the basic idea of the Analytic Hierarchy Process, the system is decomposed into different factors according to the overall objective and problem property of the system. It is combined at different levels according to the affiliation among different factors to form a multi-level analysis structure model composed of the goal level, the criteria level and the index level.

On the other hand, experts are invited to compare the relative importance of various factors pairwise to determine the relative importance of each factor. The construction of a pairwise comparison matrix is the key to the Analytic Hierarchy Process (For a factor at the above level). The relative importance, specific criteria and meaning of the relative elements at the goal level are showed in Table 1.

Table 1 Criteria and Meaning of AHP Method

Criteria	Criteria Rule
1	It is showed that "i" is as important as "j"
3	It is showed that "i" is slightly more important than "j"
5	It is showed that "i" is more important than "j"
7	It is showed that "i" is very important compared with "j"
9	It is showed that "i" is extremely important compared with "j"
2，4，6，8	The median between the two adjacent criteria values above
1/3	It is showed that "i" is slightly less important than "j"
1/5	It is showed that "i" is obviously less important than "j"
1/7	It is showed that "i" is very unimportant compared with "j"
1/9	It is showed that "i" is extremely unimportant compared with "j"

2.2 Construction of the Evaluation Index System

The evaluation on the distributing ability of the tourism distributing center mainly refers to the total evaluation on some indexes such as the arrival efficiency and local traffic efficiency of the tourism distributing center, and the output efficiency to tourism destinations. In the paper, according to the research content of the tourism distributing center, the evaluation index system is divided into the goal level, the criteria level and the index level in the principle of the overall consideration of scientific, systematic, comprehensiveness and feasibility.

The evaluation on the tourism distributing ability of the tourism distributing center is taken as the goal level. It is regarded as the main research content of the paper. The criteria level is also taken as the subsystem level, mainly including the efficiency from the tourist source to the tourism

destination, the traffic efficiency after tourists reach the tourism distributing center and the efficiency from the hotel to the first tourism destination for tourists. It is also about the decomposition of the goal level.

According to the comprehensive index of the criteria level, nine indexes are taken as the index evaluation factors of the index level after taking full account of the characteristics and use scope of AHP. They include the accessibility of tourism traffic (Time) (C1), the comfort of tourism traffic (Road Grade) (C2), the convenience of tourism traffic(Transfer Times) (C3), the accessibility of tourism traffic (The time from the destination to the hotel) (C4), the comfort of tourism traffic(Road Grade) (C5), the convenience of tourism Traffic (Transfer Times) (C6), the accessibility of tourism traffic (The time from the hotel to first scenic area) (C7), the comfort of tourism traffic(Road Grade) (C8) and the convenience of tourism traffic (Transfer Times) (C9). The indicators about the evaluation on the distributing ability are detailed in the following table:

Table 2 Quantitative Index System for the Evaluation on the Distributing Ability of Sanya City

Goal Level	Criteria Level	Index Level
Evaluation on the Tourism Distributing Ability A	Efficiency from the Tourist Source to the Tourism Distributing Center for Tourists B1	Accessibility of Tourism Traffic (Time) C1
		Comfort of Tourism Traffic (Road Grade) C2
		Convenience of Tourism Traffic (Transfer Times) C3
	Traffic Efficiency after Tourists Reach the Tourism Distributing Center B2	Accessibility of Tourism Traffic (Time from the Destination to the Hotel) C4
		Comfort of Tourism Traffic (Road Grade) C5
		Convenience of Tourism Traffic (Transfer Times) C6
	Efficiency from the Hotel to the First Tourism Destination for Tourists B3	Accessibility of Tourism Traffic (Time From the Hotel to the First Tourism Destination for Tourists) C7
		Comfort of Tourism Traffic (Road Grade) C8
		Convenience of Tourism Traffic (Transfer Times) C9

2.3 Construction of Judgment Matrix and Consistency Check

In the research, the overwhelming majority of cases should be taken account into the selection of evaluation indexes, and the judgment matrix at various levels is constructed in the scoring method of tourists and experts. The weight vectors of various matrices are calculated with Math Pro software. Then, CI and CR are calculated. The consistency judgment is carried out. The judgment matrix at the standard level is detailed in Table 3, Table 4, and Table 5.

Table 3 Judgment Matrix of Criteria Level

A	B1	B2	B3	Weight Vector wi
B1	1	1/5	1/6	0.0772
B2	5	1	1/3	0.3578
B3	6	3	1	0.5650

According to Matlab Software, it can be seen that (The maximum eigenvalue) λ max=3.0940. (Its consistency indexes) CI=0.047, RI=0.58 and CR=CI/RI=0.0810<0.1

Table 4 Judgement Matrix about Efficiency (B1) from the Tourist Source to Tourism Distributing Center for Tourists

B1	C1	C2	C3	Weight Vector wi
C1	1	1/3	1/5	0.0971
C2	3	1	1/4	0.2693
C3	5	4	1	0.6336

According to Matlab Software, it can be seen that (The maximum eigenvalue) λ max=3.0858. (Its consistency indexes) CI=0.0429, RI=0.58 and CR=CI/RI=0.0740<0.1

Table 5 Judgement Matrix about Traffic Efficiency (B2) after Tourists Reach the Tourism Distributing Center

B2	C4	C5	C6	Weight Vector wi
C4	1	1/5	1/3	0.1031
C5	5	1	3	0.6054
C6	3	1/3	1	0.2915

According to Matlab Software, it can be seen that (The maximum eigenvalue) λ max=3.0385. (Its consistency indexes) CI=0.01925, RI=0.58 and CR=CI/RI=0.0332<0.1

Table 6 Judgement Matrix about Efficiency (B3) from the Hotel to the First Tourism Destination for Tourists

B3	C7	C8	C9	Weight Vector wi
C7	1	4	6	0.6226
C8	1/4	1	4	0.2972
C9	1/6	1/4	1	0.0802

According to Matlab Software, it can be seen that (The maximum eigenvalue) λ max=3.1078. (Its consistency indexes) CI=0.0539, RI=0.58 and CR=CI/RI=0.0929<0.1

From Table 3 to Table 6, it can be see that CRs are 0.0810, 0.0740, 0.0332, 0.0929, respectively. They are all smaller than 0.1, which indicates that the consistency of the judgement matrix is in line with requirements.

2.4 Overall Hierarchical Sequencing and Consistency Check

According to the single sequencing results and the consistency check at the above level, the weight values of all elements at the goal level are obtained, and the overall hierarchical sequencing is calculated finally as shown in Table 7.

Table 7 Index Weight and Comprehensive Weight about the Evaluation on Tourism Distributing Ability

Goal Level(A)	Criteria Level(B)	Weight	Index Level(C)	Weight of the Level	Comprehensive Weight	Sorting
Evaluation on Tourism Distributing Capability(A)	Efficiency from the Tourist Source to the Tourism Distributing Center for TouristsB1	0.0772	Accessibility of Tourism Traffic (Time on the Way) C1	0.0971	0.0075	8
			Comfort of Tourism Traffic (Road Grade) C2	0.2693	0.0017	9
			Convenience of Tourism Traffic (Transfer Times) C3	0.6336	0.0489	5
	Traffic Efficiency after Tourists Reach the Tourism Distributing Center B2	0.3578	Accessibility of Tourism Traffic Time From the Destination to the Hotel) C4	0.1031	0.0369	7
			Comfort of Tourism Traffic (Road Grade) C5	0.6054	0.2166	2
			Convenience of Tourism Traffic (Transfer Time) C6	0.2915	0.1043	4
	Efficiency from the Hotel to the First Tourism Destination for TouristsB3	0.5650	Accessibility of Tourism Traffic (Time from from the Hotel to the First Tourism Destination) C7	0.6226	0.3518	1
			Comfort of Tourism Traffic (Road Grade) C8	0.2972	0.1679	3
			Convenience of Tourism Traffic (Transfer Times) C9	0.0802	0.0453	6

2.5 Comprehensive Analysis

According to the results of the weights of the criteria level and the index level in Table 7, the sorting situation of the indexes about the evaluation on the tourism distributing ability of Sanya City

can be drawn. At the criteria level about the evaluation on the tourism distributing ability of Sanya City, the efficiency from the hotel to the first tourism destination for tourists (B3) and the traffic efficiency after tourists reach the tourism distributing center (B2) account for two great weights (0.5650 and 0.3578 respectively). The efficiency from the tourist source to the tourism distributing center for tourists (B1) accounts for a relatively great weight.

Specifically, it is reflected at the index level. At the index level, first of all, the accessibility of tourism traffic (The time from the hotel to the first scenic area) (C7) and the comfort of travel traffic (Road Grade) (C5) in the distributing center account for two maximum weights (0.3518 and 0.2166 respectively). They are the two most important factors to evaluate the tourism distributing ability of Sanya City. Secondly, the comfort of travel traffic in (Road Grade) (C8) in the tourism destination and the convenience of traffic in the tourism distributing center (Transferring times) (C6) are 0.1679 and 0.043 respectively. The factors with small influence are the comfort and accessibility of traffic from the tourist source to the tourism distributing center (0.0017 and 0.0075 respectively).

3. Conclusion

Specially enhance the accessibility to other tourism destinations and the experience of tourists on the way to enhance the tourist satisfaction in Sanya City. From the evaluation model about the indexes about the evaluation about the tourism distribution ability of Sanya City, it can be seen that the weight of tourists from the hotel to the first tourism destination is high, which indicates that tourists pay much attention to the time, comfort and convenience among different tourism distributing centers.

The Chinese tourism industry has been transited from the low-level sightseeing to the high-level consumption mode experience tourism gradually. Therefore, it will become the future development direction of provinces and cities to create the deep tourism experience of the tourism destination and strengthen the experience perception from the tourism distributing center to the tourism destination.

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