

Research on the Benefit Evaluation of Holistic Tourism Competitiveness based on Entropy Weight-TOPSIS

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Abstract

The construction and operation of holistic tourism is a complex systematic project, and it is the inevitable result of the development of tourism to a certain period. In order to objectively analyze and evaluate the competitiveness and benefit of holistic tourism, firstly, this paper introduces the background of the emergence of holistic tourism and its advantages, and builds a holistic tourism competitiveness evaluation model from three dimensions. Secondly, in order to overcome the influence of subjective factors, this paper combines the entropy weight method with the TOPSIS method, and makes an objective evaluation of the model constructed. The research shows that the regional urbanization rate, the investment amount of tourism projects, and the attractiveness of tourism destinations have a significant impact on the competitiveness of the holistic tourism. Finally, this paper takes the development status of Suzhou tourism as an example, and puts forward corresponding countermeasures to improve the competitiveness of the holistic tourism.

Keywords

Tourism; Holistic Tourism; Entropy Rights; TOPSIS Model.

1. Introduction

With the continuous development of China's economy and society, tourism has entered the era of mass tourism and holistic tourism. As a strategic pillar industry and modern experiential service industry in China, tourism plays an important role in increasing taxes, promoting employment, and meeting people's growing demand for a better life. In order to vigorously develop tourism and promote the development of holistic tourism, China's State Council and Ministry of Culture and Tourism have issued a series of documents to promote the development of holistic tourism. For example, it is necessary to constantly improve tourism facilities and services, expand the tourism industry, and vigorously develop holistic tourism.

Holistic tourism refers to the process of using a region as a tourist destination, leveraging the leading role of the tourism industry, and organically integrating scattered scenic spots, thereby achieving an increase in the overall local economy and social welfare. The construction and operation of holistic tourism is a complex system engineering, which not only involves local governments, enterprises, residents, tourists and other stakeholders, but also involves industries, products, markets, spaces, talents, networks, and so on. In order to promote the development of holistic tourism, many regions have carried out beneficial exploration, for example, For example, Zhangjiajie Scenic Spot in Hunan Province launched the tourism model of "base+agricultural tourism and cultural tourism products+tourism shopping+farmers", Xianju County in Zhejiang Province launched the tourism model of "attraction+portal+global space", and Henan New County launched the tourism model of "seeing people, seeing things, seeing life" to promote the integration of cultural tourism and help tourism poverty alleviation.

In addition, many scholars have conducted in-depth research on holistic tourism. For example, Feng Xiaoxu et al[1]. pointed out that the improvement of industrial structure and infrastructure is the foundation for the development of holistic tourism. Lin Mingshui et al[2]. pointed out that the input-output ratio of tourism is crucial for the development of holistic tourism. Zhang Yihua et al[3]. pointed out that the level of holistic tourism is positively correlated with local economic development and industrial structure. Dong Nan et al[4]. pointed out that the key to deepening the development of holistic tourism is to improve the satisfaction of tourists. Xu Shaohui et al[5]. pointed out that holistic tourism has played a certain protective role in traditional ancient villages. Song Xiaoli et al[6]. pointed out that holistic tourism has played a good role in promoting the development of characteristic towns. From this, it can be seen that on the one hand, the development of holistic tourism is constrained by local resource endowments and regional conditions, and on the other hand, the development of holistic tourism promotes the upgrading of local industrial structure and the improvement of economic level. From the current research, there are still some problems in the development process of holistic tourism. For example, some local governments do not pay enough attention, the construction of tourism facilities lags behind, tourism planning is unclear, product homogenization is serious, local people's participation is not high, tourism connotation is not attractive, and tourism resources lack proper integration.

In order to identify the problems existing in the development process of holistic tourism and improve the competitiveness of holistic tourism, it is necessary to carry out an exact evaluation. In order to overcome the limitations of qualitative research methods and the shortcomings of subjective evaluation methods, this paper adopts the research method combining entropy weight and TOPSIS to objectively evaluate the competitiveness and benefit of holistic tourism in accordance with the basic principles of systematics, scientificity and operability. Entropy weight method is a quantitative research method for objective valuation, while TOPSIS is a quantitative research method for dealing with multi-objective decision-making problems. By combining the objective weights obtained by entropy weight method with the standardized judgment matrix obtained by TOPSIS, entropy-TOPSIS method is more objective in the evaluation of holistic tourism [7].

2. Construction of a Holistic Tourism Evaluation Index System

Holistic tourism is the product of tourism development to a certain period, and its focus is to play the leading role of tourism. Compared with the previous "point" and "line" tourism model, the focus of holistic tourism is to create a "comprehensive" tourism model. The development of a tourism activity is usually inseparable from tourists, tourism destinations, tourism attractions, etc[8]. In order to make an objective evaluation of the competitiveness and benefit of the holistic tourism, this paper constructs the evaluation indicators of the competitiveness and benefit of the holistic tourism on the basis of a large number of references, which are respectively the attraction of the holistic tourism destination, the support force of the holistic tourism reception facilities and the development potential of the holistic tourism. The specific content is shown in Table 1 below.

2.1. Attractiveness of Holistic Tourism Destinations

The attraction of tourist destination is the direct incentive to induce tourists to go to the tourist destination from the tourism-generating region. It can be said that if a region is not attractive, it will not trigger tourists to go. Due to the different knowledge background, life experience and emotional experience of tourists, there are certain cognitive biases on whether the same tourist destination is attractive and how attractive it is. The attractiveness of holistic tourist destinations can be considered from the following three perspectives. They are respectively the

number of domestic tourist reception, inbound overnight tourist reception and the number of national A-level tourist attractions.

2.2. Supporting Capacity of Holistic Tourism Facilities

The supporting capacity of tourism facilities is very important, because it is directly related to the healthy operation of holistic tourism. The development of any tourism activity, without the corresponding equipment support, is unthinkable. Tourist reception facilities are crucial because they are directly related to the emotional experience of tourists[9]. The supporting capacity of holistic tourism reception facilities involves a wide range of contents, including not only the supporting capacity of infrastructure, but also the supporting capacity of public facilities. Considering the availability of data and the pertinency of the research, this paper mainly selects such indicators as catering satisfaction, accommodation satisfaction, transportation satisfaction and annual completed investment volume of tourism projects.

2.3. Development Potential of Holistic Tourism

At present, there are 71 national demonstration zones for the first batch of holistic tourism in China. With the continuous advancement of the breadth and depth of holistic tourism, holistic tourism has attracted more and more attention from local governments, scholars and tourism insiders. The evaluation indicators of the development potential of holistic tourism include the regional urbanization rate, the number of highly skilled and high-level talents, the foreign exchange earned by inbound tourists, the tourism consumption of regional residents and the gross regional product of the tertiary industry.

Table 1. Evaluation of holistic tourism competitiveness and benefit

Target layer	Primary index	Secondary index	W_j
Holistic tourism competitiveness benefit evaluation A	Holistic tourist destination attractiveness B1	Domestic tourist reception C1	0.080
		Inbound overnight visitor reception C2	0.090
		The number of national A-level tourist attractions is C3	0.064
	Holistic tourism reception facilities support capacity B2	Catering satisfaction C4	0.058
		Accommodation satisfaction C5	0.063
		Traffic satisfaction C6	0.062
		Annual investment volume of tourism projects C7	0.099
	Holistic tourism development potential B3	Regional urbanization rate C8	0.197
		Number of highly skilled and high-level talents C9	0.059
		Foreign exchange earned by inbound tourists C10	0.085
		Tourism consumption of local residents C11	0.067
		Gross regional product of tertiary industry C12	0.076

3. Establishment of Entropy Weight TOPSIS Model

Entropy is a concept in thermodynamics that measures the uncertainty of system states, mainly used to measure the size of the utility value contained in the information [10]. The TOPSIS method, also known as the approximate ideal solution ranking method, includes two scenarios:

"positive ideal solution" and "negative ideal solution". By calculating the Euclidean distance between the optimal and worst solutions of each evaluation object, the evaluation object is sorted, and the degree of superiority and inferiority of each evaluation object is obtained. This is an effective method for dealing with multi-objective decision-making problems. In order to overcome the shortcomings of subjective weighting methods, such as Delphi method and analytic hierarchy process, and improve the scientificity of evaluation and decision-making, this paper combines entropy weight method and TOPSIS method, and adopts entropy weight - TOPSIS model to objectively evaluate the competitiveness and benefit of holistic tourism. The specific methods are as follows.

3.1. Establish Evaluation Index Matrix

For the evaluated object $M = (M_1, M_2, \dots, M_m)$ and evaluation index $D = (D_1, D_2, \dots, D_n)$, the value of the evaluated object M_i to indicator D_j is denoted as X_{ij} ($i = 1, 2, \dots, m; j = 1, 2, \dots, n$), then the original evaluation index matrix formed is $X_{ij} = [x_{ij}]_{m \times n}$.

3.2. Determine Weight

To eliminate the impact of different dimensions on the evaluation results, first, it is necessary to use the range transformation method to perform dimensionless transformation on the original evaluation index matrix. If the larger the indicator value used, the better, then the positive indicator calculation formula will be used; otherwise, the reverse indicator calculation formula will be used.

The calculation formula for positive indicators is:

$$V_{ij} = \frac{X_{ij} - \min\{X_{1j}, X_{2j}, \dots, X_{mj}\}}{\max\{X_{1j}, X_{2j}, \dots, X_{mj}\} - \min\{X_{1j}, X_{2j}, \dots, X_{mj}\}}$$

The calculation formula for reverse indicators is:

$$V_{ij} = \frac{\max\{X_{1j}, X_{2j}, \dots, X_{mj}\} - X_{ij}}{\max\{X_{1j}, X_{2j}, \dots, X_{mj}\} - \min\{X_{1j}, X_{2j}, \dots, X_{mj}\}}$$

Secondly, define entropy value:

$$e_j = \frac{-1}{\ln(m)} \sum_{i=1}^m P_{ij} \times \ln P_{ij}$$

Among them: $P_{ij} = V_{ij} / \sum_{i=1}^m V_{ij}$.

Finally, obtain the weight value:

$$W_j = d_j / \sum_{i=1}^m d_{ij}, \text{ in } d_j = 1 - e_j$$

3.3. Establishment of TOPSIS Weighted Normalization Matrix

Due to the different evaluation indicator units of the matrix, in order to standardize the expression, it is also necessary to standardize the values of the corresponding judgment matrix mentioned above. The specific processing method is as follows:

$$R_{ij} = \frac{X_{ij}}{\sqrt{\sum_{i=1}^m X_{ij}^2}}$$

Next, the weight obtained by the entropy weight method is multiplied by the standardized matrix to obtain the weighted feature matrix $Z_{ij}=[Z_{ij}]m \times n$.

$$Z_{mn} = \begin{bmatrix} R_{11} & R_{12} & \dots & R_{1n} \\ R_{21} & R_{22} & \dots & R_{2n} \\ \dots & \dots & \dots & \dots \\ R_{m1} & R_{m2} & \dots & R_{mn} \end{bmatrix} \times \begin{bmatrix} W_1 & 0 & \dots & 0 \\ 0 & W_2 & \dots & 0 \\ \dots & \dots & \dots & \dots \\ 0 & 0 & 0 & W_n \end{bmatrix} = \begin{bmatrix} f_{11} & f_{12} & \dots & f_{1n} \\ f_{21} & f_{22} & \dots & f_{2n} \\ \dots & \dots & \dots & \dots \\ f_{m1} & f_{m2} & \dots & f_{mn} \end{bmatrix}$$

3.4. Determine the Positive and Negative Ideal Solution Vectors

The positive ideal solution of TOPSIS is the optimal solution, and the negative ideal solution is the worst solution.

Positive ideal solution vector:

$$f_j^+ = \begin{cases} \max(f_{ij}), & j \in J^+ \\ \min(f_{ij}), & j \in J^- \end{cases}$$

Negative ideal solution vector

$$f_j^- = \begin{cases} \min(f_{ij}), & j \in J^+ \\ \max(f_{ij}), & j \in J^- \end{cases}$$

3.5. Calculate Distance Scale

The n-dimensional Euclidean formula can be used to obtain the distance d^+ between each target value and the positive ideal solution vector, as well as the distance d^- between each indicator and the negative ideal solution vector. The closer the target value is, the better the positive ideal solution is, and the farther away it is from the positive ideal solution, the worse it is. The specific calculation formula is as follows.

$$d^+ = \sqrt{\sum_{j=1}^n (f_j^+ - f_{ij})^2}$$

$$d^- = \sqrt{\sum_{j=1}^n (f_j^- - f_{ij})^2}$$

3.6. Relative Closeness and Ranking

Calculate the relative closeness D between each evaluation indicator vector and the ideal solution vector. The higher the sticking progress, the better the evaluation object, and use this

as the comprehensive competitiveness ranking of entropy weight TOPSIS. $D = \frac{d_i^-}{d_i^- + d_i^+}$.

4. Case Studies

This paper chooses Suzhou as a case study because Suzhou is not only a national key tourist city, but also one of the first 24 historical and cultural cities in China. In addition, Suzhou has also been identified as the country's only holistic tourism talent training base. In the process of tourism development, Suzhou has also put forward the integration of cultural tourism, agricultural tourism, physical tourism and industrial tourism, which has greatly promoted the integrated development of holistic tourism and tourism. The data used in this study are from Suzhou Statistical Yearbook and Suzhou Tourism Development report. The data are true and reliable, and have a certain representativeness.

4.1. Determination of Evaluation Index Matrix and Weight

Suzhou governs Gusu District, Wujiang District, Wuzhong District, Xiangcheng District, Industrial Park, High tech Zone, Zhangjiagang City, Changshu City, Taicang City and Kunshan. Since industrial parks and high-tech zones are mainly factories and enterprises, in order to make the research more targeted, this paper excludes industrial parks and high-tech zones from the selection of evaluation targets.

According to the evaluation index system established in Table 1 and the calculation formula in sections (1) and (2) of Part 2, it can be concluded that the weights of the evaluation indicators of the competitiveness and benefit of the holistic tourism of Suzhou are as follows (see weight W_i in Table 1 above). It can be seen that regional urbanization rate, annual completed investment of tourism projects, inbound overnight tourist reception, inbound tourist foreign exchange earnings, etc. have relatively high weights in the evaluation process of holistic tourism competitiveness, which also explains to a large extent the importance of these indicators for improving the competitiveness of holistic tourism.

4.2. Entropy Weight-TOPSIS Competitiveness Benefit Comprehensive Evaluation

Table 2. Comprehensive Ranking of Suzhou's Holistic Tourism Competitiveness Based on Entropy Weight-TOPSIS

Districts and cities of Suzhou	D ⁺	D ⁻	D	Ranking
Gusu District	0.083	0.073	0.470	3
Wujiang District	0.072	0.080	0.525	2
Wuzhong District	0.102	0.042	0.289	7
Xiangcheng District	0.099	0.026	0.210	8
Zhangjiagang City	0.081	0.047	0.367	5
Changshu City	0.087	0.054	0.386	4
Taicang City	0.088	0.036	0.290	6
Kunshan City	0.046	0.091	0.665	1

According to the calculation formula in subsection (3) - (6) of Part 2 above, the comprehensive ranking of the competitiveness and benefit of the holistic tourism of Suzhou is obtained through horizontal weight calculation and vertical TOPSIS calculation, as shown in Table 2 below. It can be seen that in the process of the development of regional tourism in Suzhou, there are obvious spatial differences among various districts and cities. In the case of comprehensive consideration of 12 evaluation indicators, the top ranking cities are Kunshan City, Wujiang District, Gusu District, Changshu City, Zhangjiagang, Taicang, Wuzhong District and Xiangcheng District. From this, it can be seen that the competitive benefits of holistic tourism are closely related to local location, transportation, tourism resources, and on the other hand, it is also closely related to the local government's emphasis on holistic tourism.

5. Conclusions and Suggestions

5.1. Improve Infrastructure Construction, and Constantly Improve the Attraction of Regional Tourism

The competitiveness and efficiency of holistic tourism are affected by many factors. To enhance the attraction of holistic tourism, we should first improve the construction of infrastructure. Infrastructure construction is the foundation of the development of holistic tourism and plays an important supporting role for the sustainable and healthy development of holistic tourism. It can be said that the higher the level of development of holistic tourism, the higher the requirements for infrastructure construction. With the development of holistic tourism, point-and-line tourism is constantly changing to point-and-surface tourism, and infrastructure plays an increasingly strong role in enhancing the attractiveness of tourist destinations.

5.2. Improve Tourist Satisfaction, and Continuously Increase the Potential of Regional Tourism Development

The satisfaction of tourists is an important index to measure the competitiveness of holistic tourism. Because the satisfaction of tourists is affected by many factors, it needs to be treated differently according to different situations to improve the satisfaction of tourists. The satisfaction of tourists can be considered from the six aspects of "eating, housing, transportation, travel, shopping and entertainment". Of course, the development potential of holistic tourism is not only affected by one factor, tourism satisfaction, the development potential of holistic tourism is the result of a variety of factors. Therefore, to improve the competitiveness of holistic tourism, it is necessary to adapt to local conditions, take comprehensive measures and consider in multiple dimensions.

5.3. Strengthen the Online and Offline Development of Tourism Resources, and Constantly Improve the Competitiveness of Regional Tourism

The competitiveness of holistic tourism is directly related to the level of regional economic development, regional urbanization rate and tourism destination attraction. Through this study, it is not difficult to see that the competitiveness of holistic tourism is also affected by factors such as local location, local traffic and local government support. In order to improve the competitiveness of holistic tourism, Suzhou city should strengthen the investment and construction of holistic tourism projects, and vigorously develop tourism resources online and offline according to the characteristics of the location, so as to improve the competitiveness and efficiency of Suzhou's holistic tourism.

References

- [1] Feng Xiaoxu, Xia Jiechang. Evaluation and spatial characteristics of global tourism development in China [J]. *Economic Geography*,2018,38(04):183-192.
- [2] Lin Mingshui, Liao Maolin, Wang Kaiyong. Research on competitiveness evaluation of national tourism demonstration zones [J]. *China Population, Resources and Environment*,2018,28(11):83-90.
- [3] Zhang Yihua, Wang Yuan. Research on the coupling and coordinated development of global tourism Industry and Regional economy -- A case study of Fujian Province [J]. *Technical Economics and Management Research*,2019(01):95-99.
- [4] Dong Nan, Zhang Chunhui. Study on tourist satisfaction of free forest parks in the context of global tourism: A case study of Wangshunshan National Forest Park in Shaanxi Province [J]. *Tourism Tribune*,2019,34(06):109-123.

- [5] Xu Shaohui, Liu Xiaohuan, Dong Liping. A sample of land lanes for the protection and development of traditional villages in global tourism [J]. *China Population, Resources and Environment*, 2018, 28(S1):214-216.
- [6] Song Xiaoli, Zhou Jinqun, Chen Liqin. Analysis on tourism town development strategies from the perspective of global tourism [J]. *Economic Issues*, 2017(06):103-107.
- [7] Cao Peipei. Evaluation of coordination between urban tourism and urban development based on entropy weight-TOPSIS method -- A case study of 13 cities in Jiangsu Province [J]. *Modern Urban Research*, 2017(07):124-129.
- [8] Zhou Yongbo, Shen Min, Wu Jian, Wei Xiangdong. Towards quality tourism: Global tourism supply and demand mismatch and its management: a case study of Wujiang City in Suzhou [J]. *Tourism Tribune*, 2018, 33(06):36-48.
- [9] ZHAO Chuansong, Ren Jianlan, Chen Yanbin, Liu Kai. Spatio-temporal coupling and driving force of provincial tourism industry and regional development in China under the background of global tourism [J]. *China Population, Resources and Environment*, 2018, 28(03):149-159.
- [10] SUN Huangping, ZHANG Yunxiang, Shen Pengpeng, Li Yanjie, WANG Kun. Research on tourism competitiveness of urban agglomerations in the new stage based on entropy weight set analysis: A case study of Yangtze River Delta urban agglomerations [J]. *Resource Development & Market*, 2017, 33(02):214-218.