

Measurement and difference analysis on tourism competitiveness of Blue Economic Zone

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Abstract. Blue Economic Zone is the first regional development strategy in China with the theme of marine economy, including all the sea areas in Shandong province and six cities of Qingdao, Dongying, Yantai, Weihai, Weifang, Rizhao as well as Wudi, Zhanhua counties in the administrative division of Binzhou. This paper tentatively constructed the evaluation index system of tourism competitiveness of Blue Economic Zone on the basis of interpretation on tourism current situation in Blue Economic Zone, and exploited the improved entropy method and the fuzzy comprehensive evaluation method for quantitative evaluation on the tourism competitiveness of each city in the region.

1. Introduction

Blue Economic Zone is the first regional development strategy in China with the theme of Marine economic and is also a significantly strategic move to actively promoting marine and land economic coordination. The coastal zone of Blue Economic Zone is rich in resources of which coastal tourism and landscape resources are particularly prominent. It can be comparable to the developed countries and regions in the seaside tourism in the world. Competition is the driving force for development of tourism economic and the research on the competitiveness of regional tourism is also attracting more and more scholar's attention. Therefore, the measurement and analysis of tourism competitiveness in the cities in Blue Economic Zone is the key to the development of the tourism industry in Blue Economic Zone.

2. Research area situation

Blue Economic Zone consists of all sea areas in Shandong province and six cities of Qingdao, Dongying, Yantai, Weihai, Weifang, Rizhao as well as Wudi, Zhanhua counties in the administrative division of Binzhou, totally 51 counties. The sea area is 159500 square kilometres and the land area is 64000 square kilometres. The other areas in Shandong province are the planning linkage areas ^[1]. Blue Economic Zone is rich in natural marine resources and has a sound economic development foundation, the tourism industry is developing rapidly. Meanwhile, the development of tourism in Blue Economic zone has its advantages of resources, location, economy and policy, it also faces the opportunities such as national strategy promotion, government policy support and the enhanced consumption demand ^[2]. The research object of this paper is the 7 cities in Blue Economic Zone. We used the data of the whole city of Binzhou in order to obtain the data conveniently. The data ended by the end of 2013.



3. Steps and methods

3.1. Construct evaluation indexes system

This paper divides the evaluation index system of tourism competitiveness of Blue Economic Zone into four levels, which is the target level (A), the first grade index (B), the second grade index (C) and the third grade index (D). There are 4 first grade indexes, 13 second grade indexes, and 30 third grade indexes [3]. The data of the indexes mainly come from Shandong Statistical Yearbook, China Urban Statistical Yearbook, China Tourism Statistical Yearbook, Statistical Yearbook of the related cities and government websites, etc. See the table 1 for details.

Table 1. Tourism competitiveness evaluation index system and multilevel structure index weight

Target	The first grade indexes	The first indexes to the target level	The second grade indexes	The second indexes to the target level	The second indexes to the first indexes	The third grade indexes	The third indexes to the target level	The third indexes to the second indexes
Tourism competitiveness evaluation index system of Blue Economic Zone A	Tourism supply B1	0.2645	Resource supply C1	0.1015	0.3838	D1 ^a	0.0324	0.3186
			Facilities supply C2	0.0673	0.2542	D2 ^a	0.0325	0.3202
			Service supply C3	0.0958	0.3620	D3 ^a	0.0367	0.3611
						D4 ^a	0.0310	0.4611
						D5 ^a	0.0362	0.5389
						D6 ^a	0.0321	0.3355
						D7 ^a	0.0327	0.3418
						D8 ^a	0.0309	0.3227
						D9 ^a	0.0307	0.2429
			Development scale C4	0.1262	0.4818	D10 ^a	0.0321	0.2547
	Tourism demand B2	0.2620	Development speed C5	0.0692	0.2640	D11 ^a	0.0318	0.2521
						D12 ^a	0.0316	0.2503
						D13 ^a	0.0347	0.5016
			Development structure C6	0.0666	0.2542	D14 ^a	0.0345	0.4984
						D15 ^a	0.0329	0.4947
			Location environment C7	0.0662	0.2421	D16 ^a	0.0336	0.5053
						D17 ^a	0.0332	0.5020
	Tourism environment B3	0.2734	Economic C8	0.0739	0.2704	D18 ^a	0.0330	0.4980
						D19 ^a	0.0373	0.5046
			Ecological environment C9	0.0661	0.2417	D20 ^a	0.0366	0.4954
						D21 ^a	0.0333	0.5039
						D22 ^a	0.0328	0.4961
			Cultural environment C10	0.0672	0.2458	D23 ^a	0.0341	0.5072
						D24 ^a	0.0331	0.4928
	Tourism impact B4	0.2001	Economic impact C11	0.0690	0.3448	D25 ^a	0.0361	0.5232
			Social impact C12	0.0619	0.3092	D26 ^a	0.0329	0.4768
						D27 ^a	0.0303	0.4894
			Ecological impact C13	0.0692	0.3460	D28 ^a	0.0316	0.5106
						D29 ^a	0.0316	0.4569
						D30 ^a	0.0376	0.5431

^aFrom D1 to D30: Tourism resource density, Tourism resource grade, Coastal length, The number of travel agencies, The number of star hotels, The number of employees in the tertiary industry, The proportion of tertiary industry practitioners, Local public service expenditures, The number of inbound tourists, International tourism revenue, The number of domestic tourists, Domestic tourism revenue,

Tourist income of annual growth rate, Tourism population of annual growth rate, International tourism revenue accounted for the proportion of total tourism revenue, Domestic tourism revenue accounted for the proportion of total tourism revenue, Total passenger volume of per year, The total mileage of the grade highway, Per capita GDP, Urban dwellers' disposable income, Per capita of green area, Local environmental protection of financial expenditure, Public library collection of per 100 persons, The expenses of cultural relics and cultural undertakings, Total tourism revenue accounted for the proportion of the tertiary industry, Total tourism income accounted for GDP, Average salary of employed persons, Local employees account for the proportion of the total population, Built-up area green coverage, Annual environmental air quality compliance rate.

3.2. Determine the index weight

In this paper, we use the improved entropy method to determine the weight of the index. This method has the advantages of maximum using the structure information given by the evaluation matrix to calculate the weight coefficient of each target^[4]. According to the entropy method, the weight of each index in single-level structure is obtained, because the quantity indicators in each level is different, as a result, the final weight is corrected according to the ratio^[5]. As is shown in the table 1.

3.3. Determine the evaluation set

According to the practical needs and ultimate goal of evaluation, the evaluation criteria for competitiveness of seven cities in the Blue Economic Zone are divided into four levels and the corresponding comments are “extremely strong”, “strong”, “light strong”, “weak”, the evaluation rating set is : $V = (v_1, v_2, v_3, v_4) = (\text{extremely strong}, \text{strong}, \text{light strong}, \text{weak})$.

3.4. Membership function and determine the membership

Common Membership Function can be divided into rectangular distribution, trapezoidal distribution, normal distribution, cauchy distribution^[6]. According to the experience of predecessors' subordinate function construction, this paper adopts the semi-trapezoidal distribution function to establish the membership degree of each grade of evaluation index according to the grading standard of evaluation index.

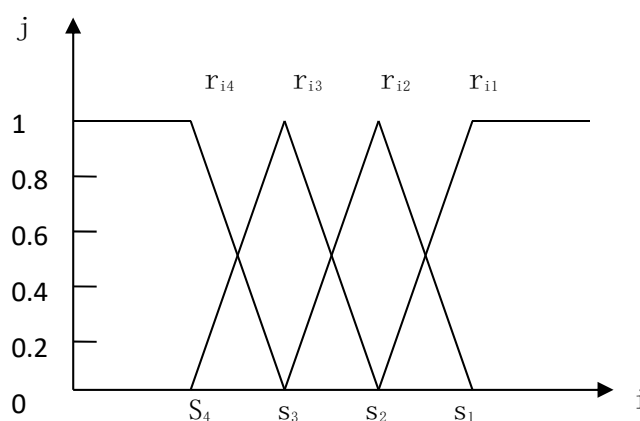


Figure 1. Half trapezoidal distribution

When the evaluation set is divided into four grades, the formula for the membership function of the semi-trapezoidal distribution is as follows:

Where $j = 1$, the membership function of the first level is:

$$r_{i1} = \begin{cases} 1 & x_i \geq s_{i1} \\ (x_i - s_{i2}) / (s_{i1} - s_{i2}) & s_{i2} < x_i < s_{i1} \\ 0 & x_i \leq s_{i2} \end{cases} \quad (1)$$

Where $j = 2$, the second level membership function is:

$$r_{i2} = \begin{cases} 1 & x_i = s_{i2} \\ (s_{i1} - x_i) / (s_{i1} - s_{i2}) & s_{i2} < x_i < s_{i1} \\ (x_i - s_{i3}) / (s_{i2} - s_{i3}) & s_{i3} < x_i < s_{i2} \\ 0 & x_i \leq s_{i3} \text{ 或 } x_i \geq s_{i1} \end{cases} \quad (2)$$

Where $j = 3$, the third-level membership function is:

$$r_{i3} = \begin{cases} 1 & x_i = s_{i3} \\ (s_{i2} - x_i) / (s_{i2} - s_{i3}) & s_{i3} < x_i < s_{i2} \\ (x_i - s_{i4}) / (s_{i3} - s_{i4}) & s_{i4} < x_i < s_{i3} \\ 0 & x_i \leq s_{i4} \text{ 或 } x_i \geq s_{i2} \end{cases} \quad (3)$$

Where $j = 4$, the membership function of the fourth level is:

$$r_{i4} = \begin{cases} 0 & x_i \geq s_{i3} \\ (s_{i3} - x_i) / (s_{i3} - s_{i4}) & s_{i4} < x_i < s_{i3} \\ 1 & x_i \leq s_{i4} \end{cases} \quad (4)$$

In this formula: x_i is the actual value of the evaluation index i , r_{ij} is the subordination of level i to level j , s_{i1}, s_{i2}, s_{i3} and s_{i4} are separately 1 to 4 grading standards of factor i .

According to the above evaluation process, the fuzzy comprehensive evaluation of tourism competitiveness of seven cities in Blue Economic Zone can be obtained, as is shown in table 2.

Table 2. Comprehensive evaluation results of Blue Economic Zone city tourism competitiveness

City	v1	v2	v3	v4	Score
Qingdao	0.5079	0.2064	0.1844	0.1013	91.21
Yantai	0.0713	0.4362	0.4130	0.0795	84.99
Weihai	0.2098	0.2230	0.3793	0.1879	84.55
Rizhao	0.0690	0.1606	0.3173	0.4531	78.46
Weifang	0.1032	0.3010	0.4566	0.1392	83.68
Dongying	0.1471	0.1774	0.5685	0.1069	83.65
Binzhou	0.1028	0.0524	0.7207	0.1241	81.34

4. Result Analysis

According to the result of fuzzy comprehensive evaluation of tourism competitiveness among each city in Blue Economic Zone, it can be seen that Qingdao has the highest grade and highest membership in “V1 extremely strong”. Yantai and Weifang have the strong membership in “V2 strong”. Dongying and Binzhou is relatively high in the “V3 strong” level membership. Rizhao is high in the “V4 weak” level membership. From the fuzzy evaluation result, Qingdao has the highest score, Yantai, Weihai, Weifang, Dongying are in the medium, while Bizhou and Rizhao are relatively low. However, the research angle chosen in this paper is not only the final result and simply reflect the

competitiveness of tourism, but also attempt to reveal the reasons for the differences in the tourism competitiveness among these cities.

As the tourism development core city in Blue Economic Zone, Qingdao is the center of growth and innovation for tourism in Blue Economic Zone. Qingdao also has obvious tourism competitive advantages and it is far ahead of other cities in this area. From the perspective of membership vector of secondary evaluation index of tourism competitiveness of Qingdao, it has absolute advantages in terms of facilities supply, service supply and development scale, etc. And the resource supply, location environment, economic environment and ecological environment also have obvious advantages. In addition to its development speed and ecological impact, most of the other indices are also ranked higher and are the leading city in Blue Economic Zone. However, the core position of Qingdao has only reflected in the relative perspective and it is judged by the tourism competitiveness among seven cities in Blue Economic Zone. In fact, in the absolute sense, the polarization of Qingdao is not strong and its influence on neighboring cities is relatively weak, which restricts its exertion on the tourism “co-competitive” in the region. Therefore, Qingdao should also strengthen its ties with other cities in Blue Economic Zone, enhancing the driving effect on the surrounding areas and create a good tourism environment, while promoting the development of local leisure tourism and it will also promote tourism in the entire Blue Economic Zone industry to take off.

Although Yantai, Weihai, Weifang and Dongying have relatively high degree of membership in “V2 strong” and “V3 light strong” levels, their competitiveness scores are not much different either, however, the specific differences between each of the indicators are still obvious. As one of the relatively early coastal cities, Yantai cannot compare with Qingdao, but in terms of membership vector of secondary evaluation index of tourism competitiveness, some indexes are still come out to top, such as the development structure, cultural environment, etc. The scale of development, ecological environment, economic impact and other indicators ranked relatively higher, but the pace of development and social influence is still relatively backward. Moreover, the supply of resources, ecological environment, economic impact, social influence and ecological impact of Weihai are all the predominant factors. By the way, the supply of facilities and the economic environment are also considerable, but the pace of development and location environment are still relatively backward. Weifang and Dongying have advantages in development speed, location environment, economic environment, and social influence. While they also need to develop their resources supply and facilities supply separately. The location environment of Dongying is yet to be optimized. As the nucleus of tourism development in Blue Economic Zone, Yantai, Weihai, Weifang and Dongying have great development potential. Only by adopting different development strategies for each city and taking the right remedy can they achieve rapid and sound development. Furthermore, the integrated tourism competitiveness of Blue Economic Zone can be enhanced.

The tourism competitiveness of Rizhao, Binzhou are relatively weak among the 7 cities in Blue Economic Zone. According to the membership vector of secondary evaluation index of tourism competitiveness, indicators such as facility supply, location environment and economic environment of Rizhao and other indicators such as resource supply, facility supply, development scale and ecological influence of Binzhou have a big gap compared to other cities. However, they have performed better in terms of economic impact and speed of development. As a potential of tourism development in Blue Economic Zone, Rizhao and Binzhou have not yet formed a good atmosphere for the development of tourism at present. At the same time, due to the relative lack of tourism resources and mining integration, there is a problem of small size and lack of attractiveness. There is great tourism development potential in both cities if we can strengthen the investigation and evaluation of tourism resources development and integration, improve tourism infrastructure and service development facilities, and create a good tourism environment.

5. Conclusions

Based on the analysis of the present situation of tourism development in Blue Economic Zone, this paper constructed the index system of tourism competitiveness evaluation in Blue Economic Zone. By

using improved entropy method and fuzzy comprehensive evaluation method, the tourism competitiveness of each city in the region is quantitatively evaluation and the differences of tourism competitiveness are analyzed. The result shows that in Blue Economic Zone, Qingdao is the largest city where is the center of tourism growth and innovation in Blue Economic Zone. Yantai, Weifang, and Dongying are the backbone of the tourism growth in Blue Economic Zone and should adjust measures appropriately to the actual situation and take the different development strategies for each city. The tourism competitiveness of Rizhao and Binzhou are relatively weak, but over time, the development of tourism in both cities has great potential.

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