Quantitative Comparative Analysis of the Cruise Homeport Competitive Situation in China - Taking Shanghai, Xiamen, Tianjin and Sanya for Example

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Abstract

This paper establishes the comprehensive evaluation index system of cruise homeport competitiveness through the analysis of the affecting factors. Then, using the factor analysis method conducted an empirical quantitative comparative analysis of the four big cities (Shanghai, Xiamen, Tianjin and Sanya) which are the most representative of domestic cruise homeport construction. Studies show that: the cruise port conditions, comprehensive service capabilities, level of economic development, transport and telecommunications accessibility degree four major cities on five indicators have their own characteristics: Cruise homeport comprehensive competitiveness Shanghai strongest, Xiamen weakest, Tianjin huge potential for development, apart from the cruise port conditions, the other aspects of Sanya need to be strengthened. Finally, some suggestions for the development of cruise homeport and layout have been provided.

Keywords: Cruise homeport; Competitiveness; Factor analysis method; SPSS17.0

The development of cruise tourism cannot be separated from the support of the cruise port, cruise ports are of three main types: homeport, port and dock [1]. Among them, the cruise homeport refers to the cruise port of departure and cruise base, which can provide comprehensive services and facilities for more than one large cruise ship to dock overnight and import or export, such as cruise supplies, maintenance and repair, staff rotation etc. The level of its development has become an important symbol to measure the level of social and economic development of a country or a region [2]. The experience of foreign countries shows that, with cruise homeport is the key and core for the development of cruise tourism. In the front of enormous economic and social benefits of cruise tourism , Shanghai, Xiamen, Tianjin, Dalian, Sanya, Qingdao, Shenzhen, Ningbo are actively building the cruise homeport.

This paper takes Shanghai, Xiamen, Tianjin and Sanya , which are the maturest cities in the process of domestic cruise homeport construction. A quantitative method of factor analysis is used to analyze the the competitive situation of domestic cruise homeport. On the basis of the relevant literature, the paper established the comprehensive evaluation index system of cruise homeport competitiveness. This index system includes four categories a total of 28 small index, measuring the competitiveness of four big cruise homeport cities from the cruise port conditions, comprehensive ability of tourism service, the level of economic development, transportation and telecommunications accessibility respectively. I hope it can provide a reference for the construction and overall layout of domestic cruise homeport.

1. Establishment of index system, Data sources and Method description

1.1 Establishment of the index system

Numerous factors influence cruise homeport competitiveness complex. Many experts' point of view is worth learning from[3-8]. On the basis of relevant literature and consulting experts, this paper established the comprehensive evaluation index system of cruise homeport competitiveness (see Table 1).

Table 1: comprehensive evaluation index system of cruise homeport competitiveness

The first level	The second level
A: cruise port condition	**A1: number of existing major cruise port A2: GFA A3: length of coastline A4: the number of berths in use A5: pier design clearance capacity A6: the annual reception number of immigration cruise tourists**
B:comprehensive ability of tourism service	**B1: number of national 4A (above) level scenic spots B2: tourism foreign exchange earnings B3: the annual number of overseas visitors B4: the annual number of domestic tourists B5: number of star hotels B6: per capita public green area B7: green coverage**
C:the level of economic development	**C1:the proportion of tertiary industry in the national economy C2: regional GDP C3: per capita GDP C4: per capita disposable income of urban residents C5: local revenues C6: annual import and export trade volume C7: annual total fixed asset investment C8: annual retail C9: the annual added value of the tertiary industry**
D:transportation and telecommunications	**D1: highway mileage D2: the number of urban rail transit D3: number of civil airports D4: the number of annual passenger traffic D5: civil airport passenger throughput D6: The number of annual total postal businesses**

1.2 Index system and data source description

1.2.1 Cruise port condition

Selecting five cruise ports of the four big cities, they are: Shanghai Wusongkou international cruise port, Shanghai international passenger transportation center dock , Xiamen Strait cruise center, Tianjin international cruise homeport and Phoenix Island International Cruise Port [9]. It should be noted that, in the statistics of Shanghai, various data of cruise port conditions is the sum of the relevant data of two major ports. Data statistics for the year 2012. Most of the data come from the statistical yearbook or bulletin of statistics of the City.

1.2.2 Comprehensive ability of tourism service

Comprehensive ability of tourism service contains two aspects: the attractiveness of tourism resources and tourism reception service ability. The number of national 4A (above) level scenic spots, tourism foreign exchange earnings, the annual number of overseas and domestic visitors can measure the attractiveness of tourism resources. The number of star hotels, per capita public green area and green coverage is to measure the ability of tourism reception service. These indicators affect the comprehensive ability of tourist service together. Data statistics for the year 2012. Most of the data come from the statistical yearbook or bulletin of statistics of the City.

1.2.3 The level of economic development

Per capita GDP, per capita disposable income of urban and annual retail is to measure the city people's consumption capacity. The proportion of tertiary industry in the national economy, regional GDP, local revenues, annual import and export trade volume, annual total fixed asset investment, the annual added value of the tertiary industry is to measure the economic strength of the city. In addition to the index of local finance income statistics for the year 2011, all other data statistics for the year 2012. Most of the data come from the statistical yearbook or bulletin of statistics of the City.

1.2.4 Transportation and telecommunications

In addition to the index of highway mileage and the number of annual total postal businesses statistics for the year 2011, all other data statistics for the year 2012. Most of the data come from the statistical yearbook or bulletin of statistics of the City.

1.3 Method description

This study used statistical software SPSS17.0 as the analysis tool, the cruise port condition. Comprehensive ability of tourism service, the level of economic development, transportation and telecommunications by factor analysis. Finally, getting the comprehensive scores of cruise homeport competitiveness of the four cities through weighted calculation.

1.3.1 In order to avoid the inconsistency of quantities and dimensions among the indexes, the paper choices the following formula (Formula one) to standardize the original data :

$$b_{ij} = \frac{B_{ij} - \min\left[B_{ij}\right]}{\max\left[B_{ij}\right] - \min\left[B_{ij}\right]} \qquad \text{（Formula One ）}$$

B_{ij} represents the data values of the j-th small index in i-th category index , b_{ij} is the standardization value of B_{ij} ($1 \leqq i , j \leq 4$ and is an integer).

1.3.2 The standard deviation rate reflects the explanatory ability of factors on the total variance of the original variables, the higher the value, the higher importance the factor [10]. Weighting calculation the comprehensive scores of cruise homeport competitiveness of the four big cities, we use formula two which contain n city and M indices, as following [11]:

$$\begin{cases} \sigma i = \sqrt{\dfrac{\sum_{j=1}^{n}[F_{ij} - E(F_{ij})]^2}{n}} \\ W_i = \dfrac{\sigma i}{\sum(\sigma i)} \\ A_j = \sum_{i=1}^{m} F_{ij} \times W_i \end{cases} \qquad \text{（Formula Two）}$$

F_{ij} is the comprehensive score of the i-th index of the j-th city, E (F_{ij}) is the average scores of each city's value of i-th index, σi is the standard deviation of the i-th index, W_i is the weight of the i-th index (the standard deviation rate), F_{ij} is the score of i-th index ,A_j is the cruise homeport competitiveness score of the j-th city ($1 \leq i, j \leq 4$ and is an integer)

2. Empirical Quantitative Comparative Analysis

2.1 Sample selection

This study selected four Cities: Shanghai, Tianjin, Xiamen and Sanya. The main reason for it include the following aspects: First, from the layout point of view, the four largest port cities of uniformly distributed in China's mainland coastline, can comprehensive represent the development level of cruise homeport in coastal area of China. Second, the four cities located in the best three regions of Chinese cruise industry development -- Bohai rim, Yangtze River Delta and the Pearl River Delta region. Third, from the development prospects of cruise homeport in China, they have the largest development potential in the future.

2.2 Empirical quantitative comparative analysis

2.2.1 Comparison of Cruise port condition

Input the standardized (using the formula one) statistical data into SPSS17.0 statistical software, and get the following chart by setting software (Table two, three, four and Fig. 1).**(1) Suitable test of factor analysis method**

Table 2: Correlation Matrix

	A1: (individual)	A2: (Million square meters)	A3: (meter)	A4: (individual)	A5: (Million people/year)	A6: (Million people)
A1: (individual)	1.000	.506	.869	.968	.636	.956
A2: (Million square meters)	.506	1.000	.462	.374	.071	.622
A3:(meter)	.869	.462	1.000	.942	.191	.956
A4:(individual)	.968	.374	.942	1.000	.505	.956
A5:(Million people/year)	.636	.071	.191	.505	1.000	.387
A6:(Million people)	.956	.622	.956	.956	.387	1.000

As shown in the Table 2, the correlation coefficient of most variables is greater than 0.3, indicating that they are related. Therefore, we can do the factor analysis.

(2) Characteristic value, contribution rate and accumulative contribution rate

Table 3: Total variance explained

Ingredient	Initial eigenvalues			Extraction of sum of squares loaded			Rotate squares and loading		
	Total	Variance %	Accumulation %	Total	Variance %	Accumulation %	Total	Variance %	Accumulation %
1	4.347	72.452	72.452	4.347	72.452	72.452	3.537	58.950	58.950
2	1.021	17.016	89.469	1.021	17.016	89.469	1.831	30.518	89.469
3	.632	10.531	100.000						
4	4.533E-17	7.555E-16	100.000						
5	-1.600E-16	-2.666E-15	100.000						
6	-3.936E-16	-6.561E-15	100.000						

Extraction Method: Principal Component Analysis

As can be seen from the Table 3, the first two factors of the cumulative variance contribution rate of 89.469% (over 85%), so choosing the first two factors will be able to describe the overall level of the cruise port conditions. Moreover, from the factor scree plot (Figure 1) we can see, the characteristic roots value of first two factors is higher, it has a larger contribution for interpretation of the original variables. The eigenvalues is very small after the third factor, the contribution for interpretation of the original variable is small. Therefore, extracting the first two factors are more appropriate.

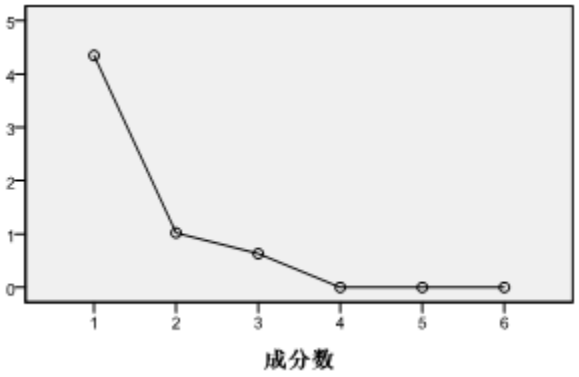

Fig. 1 Factor Scree Plot

(3) Factor rotation

In order to make the coefficient of loading matrix differentiation from 0-1, we need do the varimax rotation on the initial factor loading matrix, the rotated factor loading matrix as shown in Table 4:

Table 4: Rotating component matrices

	Component	
	1	2
A6:(Million people)	.928	.371
A3:(meter)	.908	.267
A4:(individual)	.792	.571
A1:(individual)	.785	.619
A2: (Million square meters)	.778	-.196
A5:(Million people/year)	.060	.935

Extraction Method: Principal Component Analysis

(4) Computing factor scores

Therefore, the score function of cruise port condition (A) is as follows:

$$\begin{cases} A=0.5895X1+0.30519X2 \\ X1=0.928A1+0.908A2+0.792A3+0.785A4+0.778A5+0.060A6 \\ X2=0.371A1+0.267A2+0.571A3+0.619A4-0.196A5+0.935A6 \end{cases}$$

Results and the ranking of the four major cities is shown in Table 5 and Figure 2. The condition of Shanghai cruise port is ahead of the other three cities, belong to the first group; Sanya, Tianjin and Xiamen points two, three, and four respectively. However, the gap of cruise port between the three major cities is not significant, they should belong to the second group.

Table 5: Index scores and rankings

	A Index		B Index		C Index		D Index			
	Score	**Rank**	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Rank**	**The total score**	**Overall ranking**
Shanghai	3.2218	1	1.7744	1	4.4637	1	2.4334	1	3.3083	1
Xiamen	0.3922	4	0.9427	2	1.4062	3	0.1942	3	0.4035	4
Tianjin	0.5690	3	0.4217	3	2.1217	2	1.3830	2	1.5749	2
Sanya	0.9338	2	0.3776	4	0.6281	4	0.0939	4	0.4758	3

Note: The index score four decimal places reserved

2.2.2 Comparison of comprehensive ability of tourism service

Known by the correlation matrix table, we can use factor analysis. Extract the common factor from the categories of indicators in the same method. The total table of explained variance shows that the cumulative contribution rate of the first two factors was 86.979% (more than 85%). So, selecting the top two factors can represent the 7 original indexes. The score function of cruise tourism comprehensive service ability (B) of each city is as follow:

$$\begin{cases} B=0.53496Y1+0.33483Y2 \\ YI=0.998B1+0.958B2+0.958B3+0.908B4-0.217B5-0.191B6-0.075B7 \\ Y2=-0.05B1-0.137B2-0.231B3-0.412B4+0.974B5+0.885B6+0.607B7 \end{cases}$$

The calculation results and rankings shown as table five and figure two. From the score situation we can see, a smaller gap between the four big cities. The order from high to low: Shanghai, Xiamen, Tianjin, Sanya. Among them, Shanghai's score is 1.7744, belonging to the first group; Xiamen with 0.9427 points ranked second group; Tianjin and Sanya respectively 0.4217 and 0.3776 belong to the third group.

2.2.3 Comparison of the level of economic development

Processing the data by the same method, processing results show that the cumulative contribution rate of the first two factors was 90.822% (more than 85%). Therefore, the top two common factors can represent the original 9 indicators. The score function of the level of economic development (C) is as follow:

$$\begin{cases} C=0.63012Z1+0.2781Z2 \\ Z1=0.992C1+0.989C2+0.974C3+0.966C4+0.931C5+0.659C6+0.14C7+0.541C8+0.461C9 \\ Z2=0.011C1+0.134C2+0.205C3+0.234C4+0.332C5+0.232C6-0.963C7+0.839C8+0.77C9 \end{cases}$$

The calculation results and rankings as table five and figure two. Shanghai in the first group to great advantage, Tianjin, Xiamen and Sanya are respectively in the second, third and fourth group.

2.2.4 Comparison of transportation and telecommunications

To deal with this type of data in the same way, processing results show that the cumulative contribution rate of the first two factors was 96.741% (more than 85%), the first two common factors can reflect the original 6 indicators. The score function of transportation and telecommunications (D) is as follow:

$$\begin{cases} D=0.52811P1+0.4393P2 \\ P1=0.999D1+0.991D2+0.97D3+0.114D4+0.399D5-0.274D6 \\ P2=0.014D1-0.066D2+0.242D3+0.97D4+0.911D5+0.896D6 \end{cases}$$

The calculation results and rankings as table five and figure two. The score has a serious polarization, in which, Shanghai and Tianjin respectively by a large margin belong to the first and second group; Xiamen and Sanya to lower level belong to the third group.

2.3 Comparison of Cruise homeport comprehensive competitiveness

The product between comprehensive scores of four groups of indexes and the corresponding standard deviation rate is the comprehensive score of cruise homeport competitiveness of the city. The calculation results of standard deviation and standard deviation rate as shown in table six. The comprehensive score of each city and cruise homeport competitiveness rankings are shown in table five and figure two. From the overall situation of the comprehensive score of cruise homeport competitiveness of the four big cities, we can see that, there is a big gap between the four cities. Shanghai, by a large margin, belongs to the first group; Tianjin scoring 1.5749 points comes second, it belongs to the second group; Sanya and Xiamen respectively get 0.4758 and 0.4035 at the third, fourth place, they belong to the third group.

Table 6: Standard deviation and standard deviation rate of each index

	A	B	C	D
σi	1.138436	0.562655	1.433817	0.957722
Wi	0.278167	0.13748	0.350341	0.234011

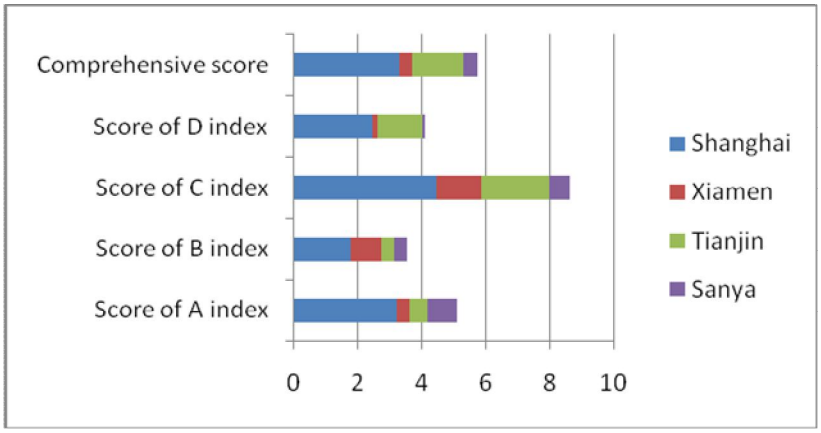

Fig. 2 Score and ranking of each index for four big cities

3. The development strategy of domestic cruise home port

The construction and development of domestic cruise homeport is still in the "initial stage", although it has a good momentum of development, there are still many problems, mainly as follows: "embarrassed route "," helpless policy "and" need to improve the standard of service urgently ". In the light of these problems, the following development strategy is been proposed:

First, consolidating the existing route, and integrating of resources to open new routes actively. At present, the cruise tourism routes in China are short and single, urgently need to be cultivated. Bohai rim region and the Yangtze River Delta region are mainly focused on Japan and South Korea route. The Pearl River Delta region is mainly limited to Vietnam ,Hong Kong and Taiwan routes. So, for the traditional routes to the South Korea and Vietnam, A "normalization mechanism" is needed. In addition, we should integrate the tourism resources of mainland coast and the South China Sea area actively, encourage cooperation between the ports, and develop more coastal routes.

Second, perfecting the policy and service system, and promoting the development of cruise homeport in a healthy and quick way. (1) increase the efficiency of customs clearance, streamline customs procedures. (2) positively stive for Cruise Port 72 hour transit visa policy, to strengthen domestic cruise tourism attraction. (3) establishing the organization of the cruise industry development, unify and coordinate cruise port and cruise tourism.

Third, strengthening the professional training, improving the service quality and service level of standardization. For cruise travel is a part of the modern service industry, it has some higher requirements on the staff quality and service standards.

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