A Study on the Evaluation of Urban Tourism Competitiveness in Guangdong-Hong Kong-Macao Greater Bay Area

Liang Yang, Li Yu
College of Business Administration, He Yuan Polytechnic, Heyuan, Guangdong, 517000, China

Abstract. Aiming at the shortcomings in the existing research on tourism competitiveness, the article adjusted the regional tourism competitiveness evaluation index system and used the entropy method to quantitatively evaluate the tourism competitiveness of 11 cities in the Guangdong-Hong Kong-Macao Greater Bay Area from 2012 to 2018. The results show that the regional tourism competitiveness of Guangdong-Hong Kong-Macao Greater Bay Area differs significantly and can be divided into three levels. Hong Kong, Macau, Guangzhou, and Shenzhen generally have higher tourism competitiveness and are in the first rank; Zhuhai, Foshan, Huizhou, and Dongguan have average tourism competitiveness and are in the second rank; The tourism competitiveness of Zhongshan, Jiangmen and Zhaoqing is relatively weak, ranking third. Based on the conclusions of the study, the article puts forward relevant suggestions to enhance the tourism competitiveness of the Guangdong-Hong Kong-Macao Greater Bay Area, hoping to provide a reference for enhancing the tourism competitiveness of the Guangdong-Hong Kong-Macao Greater Bay Area and promote the construction of international tourism destinations in the Guangdong-Hong Kong-Macao Greater Bay Area.

1. Introduction
Due to the huge influence of tourism on the economy, society and culture, the central government has positioned tourism as a happiness industry, that is, the development of tourism is related to people's happy lives. From the perspective of regional development, many cities regard tourism as an important driving force for socio-economic development. With the development of information, transportation and payment systems and the acceleration of tourism flows, cities need more efforts to attract tourists. The competitiveness of urban tourism determines its tourism development potential. Due to the influence of tourism resource conditions, tourism market, geography, transportation and other factors, the level of urban tourism development is different. For the development of tourism, different city governments often build similar tourism projects, causing waste of resources. The government or tourism enterprises use improper means to carry out competition, but instead undermine the healthy development of regional tourism. Therefore, in order to effectively promote the harmonious and coordinated development of the tourism industry, it is necessary to evaluate the tourism competitiveness of different cities in the region in order to propose suggestions to promote the coordinated development of regional tourism, even formulate the development strategy of regional tourism.

2. Research Review
Actually, C.A.Stansfield first proposed the importance of urban tourism in the 1960s [1], his research on tourism competitiveness was earlier. In the late 1980s, with the introduction of Michael Porter's
“diamond model”, “competitiveness”began to be applied to tourism research. Crouch and Ritchie proposed a conceptual model of tourism destination competitiveness[2]. Weber et al. Used descriptive statistical analysis to evaluate the tourism competitiveness of 39 European cities[3]. Enright and Newton analyzed the tourism competitiveness of Hong Kong, Singapore and Bangkok using analysis of variance and T-test [4]. Della Corte et al. Used Milan, London and other cities as examples to explore the impact of ICT and local management on tourism competitiveness [5].

In the 1990s, Chinese scholars began to study the competitiveness of urban tourism. These scholars were mainly geographers. The main research fields are tourism competitiveness evaluation indicators and evaluation models. Su Weizhong and others have constructed an evaluation index system for urban tourism competitiveness from the aspects of tourism competition performance, tourism competition potential, and tourism competition environment support [6]. Yang Yong established a tourism competitiveness evaluation system that includes three dimensions of competitive performance, industrial potential, and technical efficiency [7]. Guo Xiangyang built an evaluation index system based on the current competitiveness of tourism, the competitiveness of the basic environment of tourism, and the potential competitiveness of tourism [8]. Zou Quan evaluated the tourism competitiveness of 31 provinces and cities in China from the perspectives of tourism input and tourism output [9].

Some scholars’ research on the competitiveness of urban tourism in Guangdong mainly uses the index evaluation method, factor analysis method, and gray correlation analysis method to evaluate the tourism competitiveness of Guangdong regions or cities. Qu Hua and Liu Rongrong used the entropy method to evaluate the tourism competitiveness of 21 cities in Guangdong, and used spatial cluster analysis to analyze the difference characteristics, and used global and local spatial autocorrelation analysis methods to explore their spatial evolution characteristics [10].

In summary, there are a lot of achievements in the study of tourism competitiveness, but there are also the following deficiencies: First, the evaluation index system and evaluation model are immature, and the social and environmental indicators are lacking. Secondly, the research data are mostly cross-section data, lacking panel data including time series. Finally, there are few research results on the competitiveness of urban tourism in Guangdong, and the research methods lack innovation. There are fewer studies on regional tourism competition and cooperation in Guangdong, Hong Kong and Macau.

This article innovates the evaluation system of tourism competitiveness, uses the entropy method to measure and analyze the tourism competitiveness of Guangdong Pearl River Delta, Hong Kong and Macau in 2012-2018, and analyzes the evolution of competitiveness and analyzes its characteristics. The Bay Area regional tourism and economic development provide decision-making references.

3. Overview of the research area
The Guangdong-Hong Kong-Macao Greater Bay Area includes the Hong Kong Special Administrative Region, Macau Special Administrative Region and Guangdong. Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen, and Zhaoqing, with a total area of 56,000 square kilometers. With a total population of about 70 million people at the end of 2017, it is one of the regions with the highest degree of openness and strong economic vitality in China, and has an important strategic position in the overall national development situation.

According to the “Outline of Development Planning for the Guangdong-Hong Kong-Macao Greater Bay Area” issued by the State Council, the country should build the Guangdong-Hong Kong-Macao Greater Bay Area into a vibrant world-class city cluster, an international technological innovation center, an important support for the construction of the “Belt and Road”, the Mainland, Hong Kong and Macau The in-depth cooperation demonstration zone has created a high-quality living circle suitable for livability, industry and travel, and a model for high-quality development.
4. Research methods and data collection

4.1. Research methods
Based on the shortcomings of the existing related research, this article follows the principles of scientificity, operability, comprehensiveness and optimization, and adopts the following methods to reconstruct the evaluation index system of regional tourism competitiveness. On the one hand, this paper uses the frequency statistics method to analyze the existing research results of tourism competitiveness, and selects the indicators with higher frequency of use. On the other hand, referring to the evaluation index system of tourism competitiveness proposed by foreign scholars, the evaluation index system is preliminarily determined. According to the opinions of relevant experts and the availability of research data, the researchers adjusted and supplemented some indicators, and finally determined the evaluation system of this study. The evaluation system is divided into 3 first-level indicators, 7 second-level indicators, and 28 third-level indicators.

This article uses the entropy method in the objective weighting method to determine the weight of the evaluation index, and calculates the competitiveness of urban tourism. The entropy method combines the attributes of the evaluation index to determine the value of the index, and determines the degree of impact on the entire target system based on the relative change of the index. The relatively large index gives greater weight, which is avoided to some extent. The errors due to subjective factors in the subjective weighting methods. The specific steps are as follows:

First, the data is standardized:
Positive indicators:

\[ X'_{ij} = \frac{X_{ij} - \min(X_{ij})}{\max(X_{ij}) - \min(X_{ij})} \]  

Reverse indicator:

\[ X'_{ij} = \frac{\max(X_{ij}) - X_{ij}}{\max(X_{ij}) - \min(X_{ij})} \]

In the formula, \( X_{ij} \) is the 7-year average of the j-th index of city i; \( X'_{ij} \) is the standardized value of \( X_{ij} \); \( \min(X_{ij}) \) is the 7-year minimum average of the j-th index of each city; \( \max(X_{ij}) \) is the 7-year maximum average of the j-th index in each city.

Second, calculate the proportion of the i-th city under the j-th index to this index:

\[ P_{ij} = \frac{X'_{ij}}{\sum_{i=1}^{n} X'_{ij}} \]  

In the formula, i = 1, 2, 3, 4, ..., n represents the province; j = 1, 2, 3, 4, ..., n represents the index; \( P_{ij} \) represents the proportion of the \( X'_{ij} \) index.

Third, calculate the entropy of the j-th index:

\[ e_{j} = -K \sum_{i=1}^{n} P_{ij} \ln(P_{ij}), K = \frac{1}{\ln n} \]  

Fourth, calculate the coefficient of variance for the j-th index:

\[ g_{j} = 1 - e_{j} \]  

Fifth, calculate the indicator weight:

\[ W_{j} = \frac{g_{j}}{\sum_{j=1}^{n} g_{j}} \]

The last, calculate the competitiveness of urban tourism:

\[ S = \sum_{i=1}^{n} W_{j} * X'_{ij} \]

4.2. Data collection
This article selects 11 cities included in the Guangdong-Hong Kong-Macao Greater Bay Area as the research objects, and collects the Guangdong Statistical Yearbook, Guangdong Tourism Yearbook, China Tourism Statistical Yearbook, China Statistical Yearbook, The statistical yearbook of the prefecture-level cities in Guangdong Province, the statistical bulletin of the national economy and social development of prefecture-level cities in Guangdong Province, et al., were used to obtain the tourism competitiveness data of 11 research cities from 2012 to 2018. The relevant data indicators are derived from existing statistical data.

5. Evaluation and analysis of urban tourism competitiveness in the Guangdong, Hong Kong and Macao Greater Bay Area

5.1. Evaluation index system and its weight
The author uses formulas (1) to (6) to weight the average data of 28 indicators of the evaluation index system for tourism competitiveness of 11 cities in Guangdong province from 2012 to 2018, and obtains the weight of each indicator (see Table 1). Five columns).

Table 1. Evaluation index system and its weight

| Target layer          | Level I index | Level II Indicators          | Level III Indicators               | weight  |
|-----------------------|---------------|------------------------------|-----------------------------------|---------|
| Tourism Competitiveness | Realistic competitiveness | C1 Scale of tourism industry | D1 Overnight visitors              | 0.0419  |
|                       |               |                              | D2 Domestic tourism income         | 0.8727  |
|                       |               |                              | D3 Tourism foreign exchange income | 0.9832  |
|                       |               |                              | D4 Total tourism income            | 0.0757  |
|                       |               |                              | D5 GDPTourism gross income / GDP   | 0.0326  |
|                       |               | C2 Development Speed of Tourism | D6 Growth rate of overnight visitors | 0.0205  |
|                       |               |                              | D7 Domestic tourism revenue growth rate | 0.1522  |
|                       |               |                              | D8 Tourism foreign exchange income growth rate | 0.1712  |
|                       |               |                              | D9 Total tourism revenue growth rate | 0.1253  |
|                       |               | Potential competitiveness C3 Resource support | D10 Quality of tourism resources | 0.0382  |
|                       |               |                              | D11 Number of employees in the tertiary industry | 0.0573  |
|                       |               |                              | D12 Tourism employment            | 0.0421  |
|                       |               |                              | D13 Number of major hotels         | 0.0513  |
|                       |               |                              | D14 Travel agency                 | 0.0549  |
|                       |               | Environmental competitiveness C4 Economic support | D15 GDP per capita | 0.0328  |
|                       |               |                              | D16 Per capita disposable income of residents | 0.0145  |
|                       |               | C5 natural environment       | D17 Investment in fixed assets     | 0.0236  |
|                       |               |                              | D18 Days of air quality compliance | 0.0235  |
|                       |               |                              | D19 Park green area per capita     | 0.0289  |
|                       |               |                              | D20 Harmless treatment rate of domestic garbage | 0.0063  |
|                       |               | C6 Cultural environment      | D21 Green coverage of built-up area | 0.0256  |
|                       |               |                              | D22 Number of universities         | 0.0327  |
|                       |               |                              | D23 Number of undergraduate and graduate graduates | 0.0214  |
|                       |               |                              | D24 Number of cultural venues     | 0.0123  |
|                       |               |                              | D25 Patent authorized quantity / 10,000 | 0.0145  |
|                       |               | C7 Traffic                  | D26 Total passenger traffic        | 0.0512  |
|                       |               |                              | D27 Highway mileage                | 0.0219  |
|                       |               |                              | D28 Per capita passenger car ownership | 0.0238  |

Based on the calculation results of the above index weights, the tourism competitiveness level of each city is calculated according to formula (7) (see Table 2).

Table 2. Evaluation results of the tourism competitiveness of the Guangdong-Hong Kong-Macao Greater Bay Area a.

| City     | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|----------|------|------|------|------|------|------|------|
| Guangzhou | 0.788 | 0.791 | 0.821 | 0.812 | 0.792 | 0.836 | 0.841 |
| Shenzhen  | 0.632 | 0.669 | 0.634 | 0.647 | 0.651 | 0.672 | 0.733 |
| Dongguan  | 0.282 | 0.314 | 0.293 | 0.291 | 0.273 | 0.281 | 0.292 |
| Huizhou   | 0.251 | 0.273 | 0.286 | 0.287 | 0.279 | 0.293 | 0.291 |
| Foshan    | 0.337 | 0.365 | 0.351 | 0.379 | 0.363 | 0.382 | 0.394 |
| Zhaoying  | 0.229 | 0.228 | 0.238 | 0.211 | 0.229 | 0.237 | 0.232 |
| Zhongshan | 0.185 | 0.216 | 0.198 | 0.192 | 0.194 | 0.201 | 0.213 |
| Jiangmen  | 0.182 | 0.213 | 0.229 | 0.231 | 0.229 | 0.231 | 0.238 |
It can be seen from Table 2 that the average score of urban tourism competitiveness of the Guangdong-Hong Kong-Macao Greater Bay Area urban agglomeration in 2018 was 0.484. Among them, Hong Kong City ranked first with a score of 0.897; Macau City scored the second. The value is 0.863, which is about twice the average. In 2017, the average score of urban tourism competitiveness of Guangdong-Hong Kong-Macao Greater Bay Area urban agglomeration was 0.468. The first place in the year was still Hong Kong with a score of 0.862; Guangzhou was the second with a score of 0.836; Macau followed closely with 0.832. In the seven years of 2012-2018, Hong Kong's tourism competitiveness was the first. The average tourism competitiveness scores of cities in the Guangdong, Hong Kong and Macau Greater Bay Area were 0.432, 0.457, 0.455, 0.455, 0.453, 0.468, 0.484. In the past seven years, Guangzhou, Shenzhen, Hong Kong, and Macau have exceeded the average tourism competitiveness score of cities in the Guangdong-Hong Kong-Macao Greater Bay Area, while tourism in Dongguan, Huizhou, Foshan, Zhaoqing, Zhongshan, Jiangmen, Zhuhai and other cities relatively weak competitiveness.

Based on the comprehensive score and ranking results calculated by the entropy method, Hong Kong ranks first among the 11 cities in the Guangdong-Hong Kong-Macao Greater Bay Area and has a prominent tourism competitiveness advantage; Macau ranks second and its tourism competitiveness ranks second. Guangzhou ranked third, Shenzhen ranked fourth; Zhuhai, Dongguan, Foshan, Zhongshan, Jiangmen, Zhaoqing and Huizhou ranked behind. This is consistent with the development status of the cities in the Guangdong, Hong Kong and Macau Greater Bay Area. This shows that the tourism competitiveness of the cities in the Guangdong-Hong Kong-Macao Greater Bay Area is significantly different, which is in line with the fact that the tourism economy of the cities in the Guangdong-Hong Kong-Macao Greater Bay Area is not balanced.

As one of the four most famous tourist cities in the world, Hong Kong has abundant tourism resources. At the same time, the quality of high-quality tourism services has also attracted a large number of repeat customers at home and abroad. In addition, Hong Kong has a good social security environment and a sound legal system. It is a gathering place for international conventions, trade and tourism. Macao, as a tourist destination where Chinese and Portuguese cultures meet, now maintains many places of interest and unique cultural features, and has unique and rich tourism resources. Secondly, the highly developed Macau gaming industry has become an important factor in attracting domestic and foreign tourists. As a political, economic, and cultural center of Guangdong Province, Guangzhou has a deep historical and cultural accumulation. However, because Guangzhou has always attached importance to economic and trade exchanges, the development of tourism resources has been slow. Shenzhen is a national science and technology innovation center and a pilot reform city in the country. The economy is developed, the city is relatively complete, and the coastline is rich in tourism resources. It attracts a large number of mainland tourists to visit. The economy of Zhuhai, Dongguan, and Foshan has developed rapidly. However, due to the excessive focus on economic development in the early stage, the development and utilization of tourism resources have been slowed down. Only in recent years have they tried hard to tap, so the development of tourism has been relatively slow. The economic development of Zhongshan, Jiangmen, Zhaoqing and Huizhou is relatively weak, and the development of tourism is relatively slow.

6. Suggestions

6.1. Focus on foundation penetration and improve development benefits
Vigorously promote basic communication and improve development benefits. Basic communication generally includes roads, railways, aviation, and waterways. Roads and railways are important means of transportation for short- and medium-distance tourism, and are important channels for improving the efficiency of inter-regional communication. The airport is an important means of transportation for long-distance and international tourism. Waterway is one of the auxiliary transportation methods in the Bay Area. The Guangdong-Hong Kong-Macao Greater Bay Area is located in the Pearl River into the sea. The water network is dense. Not only does it have well-developed freight, it also has world-class freight terminals in Hong Kong, Shenzhen, and Guangzhou. Transportation is an important foundation for the development of tourism and an important guarantee for enhancing the competitiveness of regional tourism. Therefore, the convenience of roads, railways, aviation, waterways and other means of transport in the Guangdong-Hong Kong-Macao Greater Bay Area is greatly improved. The promotion of tourism competitiveness is of great significance.

6.2. Strengthen regional cooperation and create a win-win situation
To develop the Guangdong-Hong Kong-Macao Greater Bay Area into a new benchmark for world-class tourism in the Bay Area, it is necessary to establish the concept of "global tourism", clarify their respective positions, coordinate their development, and create a win-win situation. Enhancing the tourism competitiveness of cities in the Guangdong-Hong Kong-Macao Greater Bay Area requires both self-reliance and cooperation. Only by constantly stimulating its tourism potential can it enhance its own tourism competitiveness; only through win-win cooperation can the integrated development of the tourism industry in the Bay Area become a world-class Tourism benchmarking.

7. Conclusion
The regional tourism competitiveness of Guangdong-Hong Kong-Macao Greater Bay Area differs significantly and can be divided into three levels. Hong Kong, Macau, Guangzhou, and Shenzhen generally have higher tourism competitiveness and are in the first rank; Zhuhai, Foshan, Huizhou, and Dongguan have average tourism competitiveness and are in the second rank; The tourism competitiveness of Zhongshan, Jiangmen and Zhaoqing is relatively weak, ranking third.

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