

Research on Transportation Accessibility and Tourism Willingness in Guangdong-Hongkong-Macau Greater Bay Area

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Abstract: This research takes Guangdong-HongKong-Macau Greater Bay Area as the research object, explores a new and more comprehensive analysis method of tourism management, and creatively puts forward a representation and calculation method of tourism willingness. Taking Guangdong-HongKong-Macau Greater Bay Area as an example, this article explores the relationship between accessibility and tourism intention in-depth, discovers the overall agreement relationship between accessibility and tourism intention, and emphatically analyzes the conflicts between accessibility and tourism intention ranking in some cities, finally draws the conclusion that subjective and objective factors affect each other in tourism activities, and puts forward suggestions.

Keywords: Transportation accessibility, Tourism willingness guangdong-hongkong-macau greater bay area

1. Introduction

To speed up the networking of rail transit between urban agglomerations and metropolitan areas, the government of China is actively making full use of the leading role of central cities and urban agglomerations and building modern metropolitan areas in which Beijing-Tianjin-Hebei Region, Yangtze River Delta, and Guangdong-HongKong-Macau Greater Bay Area (GBA) have become key targets of the construction of inter-city railways. Promoting the networking of urban railways has gradually become a great help to serve a high-quality development of GBA.

The development of the inter-city railway in the GBA has improved the transportation accessibility for tourists, and has provided more travel modes for tourists to choose from at the same time, thus improving tourists' willingness to travel to a certain extent. Over the recent years, most of the researches on transportation accessibility focus on finding the economic problems in the development of tourism and transportation construction, analyzing the economic links to tourism destinations based on their accessibility¹⁻², exploring the influence of accessibility on urban economic intensity³, combining accessibility with consumption expectation in tourism process⁴ and so on. The researches mainly adopted GIS model analysis, the shortest distance method, the shortest travel time^{1, 5}, etc. However, the above researches pay little attention to the relationship between accessibility and tourism willingness, which is worth of further discussion.

2. Research Methods

2.1 Transportation Accessibility Calculation

The calculation of transportation accessibility is a method to comprehensively and quantitatively characterize the convenience of a certain place's external contact and communication from the perspective of traffic. The more extensive and mature method is to use weighted average travel time to measure it⁶. In this article, the transportation accessibility algorithm is applied to tourism research, and the travel time is weighted by the total tourism income of a place, thus obtaining the tourist transportation accessibility of a certain place, and calculating the tourist transportation accessibility of 11 cities in GBA. The formula of tourist transportation accessibility is as follows:

$$A_i = \sum_{j=1}^n (T_{ij} \times M_j) / \sum_{j=1}^n M_j \quad (1)$$

In formula (1), T_{ij} is the shortest travel time for city i and j ; M_j is total tourism revenue for city j ; n is the total number of cities except city i . A_i is the transportation accessibility for city i . The smaller the value of A_i indicates the better the accessibility of city i and, conversely, the less accessibility that city i is.

2.2 Calculation of Tourism Willingness

This research creatively proposes ways to characterize city tourist willingness (WT) of tourism of the city using three different sequential evaluations by analyzing interviewees' willingness to travel across temporal interval and their order.

$$WT = (C_i \times T_i \times R_i) \quad (2)$$

$$C_i = (\sum F_i \times W_i) / P \quad (3)$$

In formula (2), WT is the willingness of tourism of each city starting from Shenzhen, C_i is the order evaluation of going to each city, T_i is the order evaluation of going to each time interval, and R_i is the order evaluation of going to each city in each time interval. Formula (3) is a comprehensive ranking score calculation method, C_i is the ranking evaluation of each city, F_i is the ranking frequency selected by each city, W_i is the ranking weight, and P is the total number of interviewees. The calculation method of T_i and R_i adopts formula (3).

2.3 Data Sources and Processing

In this research, the shortest travel time of high-speed rail is used to analyze the accessibility of tourism and transportation among 11 cities in GBA. By the end of 2020, all 11 cities in GBA have high-speed trains except Macao, and the transportation conditions have been greatly improved. On this basis, this study obtained the shortest accessibility time among cities through the official website of China Railway 12306. Among them, the high-speed rail from the Mainland to Hongkong has been suspended since the outbreak of the COVID-19 pandemic. This article uses the frequency data of December 2019 before the outbreak. Macao has not yet opened a high-speed rail but is adjacent to Zhuhai, so it is calculated based on Zhuhai's customs clearance time. However, tourism revenue comes from the "Guangdong Statistical Yearbook" (2019) and the comprehensive data obtained on the official websites of the government statistics bureaus of the cities involved, with 2019 as the standard. Relevant data concerning Macao and Hongkong comes from the tourism development of the Hongkong Special Administrative Region and the data publishing platform of the Macao Special Administrative Region Government Tourism Bureau.

In terms of measuring tourism willingness, this research adopts a questionnaire analysis method and obtains 523 valid questionnaires. This survey is to investigate the travel willingness of college students in Shenzhen to the cities in GBA from Shenzhen. The evaluation of tourism willingness is obtained based on the calculation by analyzing the respondents' willingness to travel time in four intervals (0-40min, 41-80min, 81-120min, 121min+) and the preference order of accessible cities in four districts.

3. Research and Analysis

Table 1 Evaluation of Transportation Accessibility in Guangdong-Hongkong-Macao Greater Bay Area

No.	City	Transportation Accessibility	No.	City	Transportation Accessibility
1	Guangzhou	39.508	7	Dongguan	67.032
2	Shenzhen	49.706	8	Jiangmen	73.737
3	Foshan	52.953	9	Huizhou	77.598
4	Zhongshan	60.965	10	Macao	78.197
5	HongKong	63.711	11	Zhuhai	84.020
6	Zhaoqing	66.737			

As can be seen from Table 1, the transportation availability of GBA forms a more pronounced circle structure with Guangzhou and Shenzhen as the center, i.e., Guangzhou, Shenzhen has the best transportation availability which is decreasing tier by tier to the areas around. This reflects a certain imbalance in regional development. As the geometric center, political and economic center of the region, Guangzhou has gathered a large number of tourism resources, and is also a hub city of railway transportation. It is inevitable that its accessibility is far higher than other cities. However, the gap between other cities except Guangzhou is relatively small, which is the improvement embodiment of the development coordination level in GBA.

Outline Development Plan for the Guangdong-Hongkong-Macao Greater Bay Area clearly defines the urban network spatial pattern of “pole driving, axis supporting and radiating the surrounding areas”. The two poles of Hongkong-Shenzhen and Guangzhou-Foshan are consistent with the data in Table 1 as a whole. Guangzhou, Shenzhen, and Foshan are also the three cities with the best transportation accessibility. The tourism core of GuangFu culture represented by Guangzhou and Foshan and the core of modern urban tourism represented by Shenzhen and Hongkong are all in the important position of central spot in the circle structure of cultural tourism development in GBA, which can give full play to the driving and supporting role. However, the research also believes that Zhuhai and Macao can also serve as a major core, but their transportation accessibility is not satisfactory. However, this problem has been noticed, and the government is gradually solving it through the construction of the HongKong-Zhuhai-Macao Bridge and the construction of new high-speed rail lines.

It can also be noted that although Zhaoqing is located in the marginal area of GBA, its transportation accessibility is higher than that of some cities with closer geographical location to the center. Zhaoqing, as a bridgehead on the west side of GBA, backed by the Southwest China, is an important transportation hub connecting economically developed areas and southwest provinces. Therefore, Zhaoqing is building a transportation gateway city, which is in line with the theme of “a big plan to radiate the surrounding area and build Zhaoqing, the gateway to GBA, to radiate a wider area” put forward in the Outline, to fully tap the peripheral development space of GBA, a core of cultural tourism, and to integrate cultural tourism resources in South China, Central South, and Southwest China, so that it can promote regional coordination and provide broad ideas for the development of cultural tourism in terms of spatial structure.

Table 2 Evaluation of Guangdong-Hongkong-Macao Greater Bay Area Tourism Willingness

No.	City	Tourism Willingness:	No.	City	Tourism Willingness:
1	Guangzhou	82.4	7	Dongguan	19.4
2	Shenzhen	58.6	8	Zhongshan	10.9
3	Foshan	51.9	9	Huizhou	9.7
4	HongKong	35.5	10	Zhaoqing	4.5
5	Macao	30.2	11	Jiangmen	2.9
6	Zhuhai	21.4			

Judging from Table 2, Shenzhen, as a starting city, has a high evaluation of tourism willingness, which shows that the demand for local tourism by the interviewees is still strong. Guangzhou and Foshan benefits from the formation of the G-F megalopolis, provides easy transportation conditions for tourists, making it possible for tourists to visit both places in a shorter period. This reflected the positive trend towards the willingness of respondents to travel with Guangzhou and Foshan as tourism destinations. HongKong and Macao have benefited from the blending of “one country, two systems” and the combination of Chinese and Western cultures , providing tourists with choices to travel exit. Hongkong is ranked higher than Macao because it is adjacent to Shenzhen and provides tourists with more convenient customs clearance procedures and transportation modes.

As of the end of this questionnaire survey, there is still no direct railway between mainland cities to Macao. Tourists need Zhuhai as a transit city to reach Macao. Therefore, tourists' willingness to travel to Zhuhai has been increased due to transit or stop-by visits. Also, the survey found that the interviewees preferred 41-80 minutes of travel time, followed by 0-40 minutes and 81-120 minutes. It is proof that tourists expect a certain time distance to realize the experience of cross-regional tourism when deciding the travel itinerary, but it should not take too long. The rest of the cities were ranked later due to travel time-consuming problems or the influence of cities with stronger tourist attractions in the region that can be reached at the same time.

According to Tables 1 and 2, transportation accessibility and tourism willingness show a trend of

agreement on the whole, but there are still some contradictions for Macao, Zhuhai, Zhongshan, Zhaoqing, and other cities. This shows that tourists' willingness to travel is generally consistent with the reality such as travel route, travel time, and travel destination, but some special travel needs or other reasons can still lead to travel willingness that is not consistent with accessibility. Therefore, this research reveals to a certain extent the common influence and function of subjective factors and objective factors in tourism activities.

4. Conclusion

This article explores a more comprehensive expression method of tourism competitiveness. Using the evaluation of tourism willingness can make up for the defect of judging the city's tourism competitiveness only based on accessibility in the past, and provides a new idea for the promotion of GBA's tourism competitiveness. Through the analysis of accessibility and tourism intention, apart from the core cities in GBA, which have relatively strong power, the impact of transportation accessibility on tourism willingness is not very strong, especially in Zhuhai, Foshan, Zhongshan, Zhaoqing, and other cities. Tourism planners should pay more attention to tourists' vision of deviating from the hustle and bustle of first-tier cities or the cross-regional experience of transportation duration. The core cities in GBA should grasp their convenient transportation accessibility and city attraction to consolidate their tourism status. However, other cities should actively develop tourism attractions and competitiveness with local characteristics, such as rural tourism and characteristic tourism, according to the needs of tourists, to avoid adverse effects caused by accessibility.

References

- [1] Luo Jing, Zhang Bo, Liu Siming. *Spatial Relationship between Transportation Accessibility and Tourism Economy in Guangdong-Hongkong-Macau Greater Bay Area* [J]. *Economic Geography*, 2020, 40 (10): 213-220.
- [2] Wang Haodong, Yu Xiaojun, Wang Feixiang. *Analysis of the Relationship between Highway Accessibility and Economy: Taking Guizhou Province as an Example* [J]. *Journal of Shaoyang University (Natural Science Edition)*, 2020, 17 (06): 23-30.
- [3] Ma Qiang, Guo Jianke. *Changes of Urban Transportation Accessibility and Economic Connection Intensity in Bohai Rim Region* [J/OL]. *Resource Development and Market: 1-12* [2021-01-24]. [Http://kns.cnki.net/kcms/detail/51.1448.N.20201223.1818.010.html](http://kns.cnki.net/kcms/detail/51.1448.N.20201223.1818.010.html).
- [4] Chen Cengceng, Fan Kuangsheng, Chen Wenfeng. *Fee Accessibility and Consumption Expectation of Henan Urban Railway under the Background of High-speed Railway* [J]. *Journal of Shangqiu Normal University*, 2019, 35 (03): 46-53.
- [5] Zhu Bing, Zhang Xiaolei, Gui Dongwei, et al. *Interaction between Urban Development and Transportation Accessibility in Xinjiang* [J]. *Advances in Geographical Sciences*, 2010, 29 (10): 1239-1248.
- [6] Chen Gang, Huang Xiang, Liu Dajun. *Spatial Analysis of Tourism Transportation Accessibility and Tourism Economic Links in Hubei Province* [J]. *Tourism Forum*, 2012, 5 (6): 62-66.