

Study on Tourism Spatial Structure of Urban Agglomeration in Central Region Based on Social Network Method

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Abstract: With the passage of time, China's economic development, people's life gradually pursue enjoyment, so the development of tourism has gradually become an important pillar of national economic development. According to the urban geographical location of the central region, combined with the existing tourism economic conclusions, this paper studies the urban tourism economic data of the central region by using the method of social network, so as to understand the economic development of tourism in the central region in 2019. Through the research, it can be concluded that the correlation of urban tourism economy in Central China is not high among cities, and the tourism economy of cities is relatively different. The strength and influence of tourism economy of central cities with better tourism economic development are much higher than those without tourism economic strength. The tourism economy of each adjacent city circle is relatively close and develops relatively evenly, which shows that the development of tourism economy is closely related to the tourism economic development of adjacent cities. In the urban agglomeration in the central region, there is a high connection between the tourism economy of the cities in the six urban circles. In addition, it can be seen from the tourism economic network diagram of the urban agglomeration in the central region that among the six sub urban agglomerations, the cities in the sub urban agglomerations are closely related to the tourism economy of the central cities in the sub urban agglomerations, but from the perspective of the overall tourism economy, the tourism economic relations among cities are layered, This paper puts forward some suggestions conducive to the integrated development of urban tourism economy in Central China.

1. Introduction

With the accelerating economic globalization process, urban agglomerations should be integrated gradually with various regions at the request of the state.[1] Urban agglomeration has superior conditions for tourism development, and tourism can also promote the economic transformation upgrading of urban agglomeration, improving the comprehensive competitiveness and brand image of urban agglomeration.[2] Central cities of the floating population occupies a higher proportion in our country, which provides the excellent conditions for the development of tourism economy.[3] According to the geographical scope of the central city, the central city is roughly divided into five city circle respectively: Wuhan city circle, changzhutan city circle, the central plains city belt, Taiyuan city circle and anjiang city circle. The beauty of tourism scenery is one of the important factors to attract tourists, the rich scenery resources make these city circles become the central development of tourism.[4] These indispensable tourism development conditions make the central region become an important tourist source and destination, so that the urban tourism in the

central region has developed rapidly.[5] It has become an important support for promoting the development of China's hinterland and the implementation of the "Rise of central China".[6] The proportion of the tourism economy in the central region of cities in the tourism market is gradually increasing.[7] Cooperation in tourism product development, tourist source market and other aspects has enhanced the tourism economic links between countries, presenting a multi-node, multi-thread and complex network form.[8] Economic and geography scholars extensively use network concepts and network thinking to analyze many phenomena.[9] With the introduction of social network analysis paradigm and big data acquisition methods such as tourism digital footprint, the research on tourism network structure has become an important means to explain the development of regional tourism flow.[10]

All in all, the central region of the tourism economic network provides the reference of the central region, on the basis of the existing research conclusions. By the analysis of the social network research method and the tourism economic development, reveal the characteristics and structure, provides the objective basis for the integration of the central region.

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2. Process and analysis of the data

2.1. Data source

The data mainly from 2019, Hubei province, statistical Yearbook of Hunan province, Jiangxi province, Anhui province, Henan province, Shanxi province, and the central cities in 2020, a total of 48 cities, the central urban agglomeration in 2019 cities received the total number of tourists (unit: people), 2019 in the central cities in the tourism income. Unit: 100 million yuan); 48 The total highway traffic mileage distance between cities is compiled by the national highway mileage query.

2.2. Research methods

Usually, the research of social network method uses relational data, but the actual tourism economic data is all attribute data. Therefore, Liu Chun uses the formula of converting the tourism economic connection value of urban agglomeration in the central region to convert the attribute data into relational data. The formula is:

$$R_{ij} = K_{ij} \frac{\sqrt{P_i Q_i} \sqrt{P_j Q_j}}{d_{ij}^2}$$

R_{ij} 、 K_{ij} 、 P_i 、 P_j 、 Q_i 、 Q_j 、 d_{ij} ， they represent the degree of economic ties between the cities in the central region, the extent to which region i contributes to the economic ties between cities in the central region, the total number of tourists received by any two cities in the central region respectively in 2019, the total tourism revenue of any two cities in the central urban agglomeration in 2019, the total length of roads between the two places. Thus, the contact data is binarized.

According to the data, the network density formula between cities is as follows:

$$D = \frac{\sum_{i=1}^n d_i(c_i)}{n(n-1)}$$

N 、 $d_i(c_i) = \sum_{j=1}^n (c_i, c_j)$ ， they represent the number of cities in the city network、 the relationship between the two cities is 1, and no relationship is 0.

The perspective of the 48 cities, the results show the relationship between the nodes in the network and other nodes, represents the connection between the object, namely the correlation between points, according to the overall difference, point center is divided into extroverted and introverted. The value represents the degree of connection of each city in the overall tourism economy.

$$c_{RD(i)} = \frac{c_{AD(i)}}{n-1}$$

The data on the denominator refers to the relative degree of connection between cities, which is the ratio of the absolute centrality of the i city and the most possible degree in the network. $c_{AD(i)}$ is the absolute value of the connection between cities in the central region, representing the number of connections between cities and other cities.

The data of tourism economy in central urban agglomeration is put into the formula to calculate the

development degree of urban tourism economy. The calculation formula is as follows:

$$c_{RP_i}^{-1} = \frac{c_{AP_i}^{-1}}{n-1} = \frac{\sum_{j=1}^n d_{ij}}{n-1}$$

$c_{RP_i}^{-1}$ 、 $c_{AP_i}^{-1}$ 、 d_{ij} ， they represent indicates the relative centrality and absolute centrality of cities i , respectively, the shortest distance between the points i and j .

In this paper, the intermediary center represents the number of other cities in the central city, the influence of the city of the central city, the ability of the control of the urban tourism economy in the central region in the process of urban tourism economy development, the development of tourism economy in the central region. The calculation formula of mediation centrality is:

$$c_{RB_i} = \frac{2C_{AB_i}}{(n-1)(n-2)} = \frac{2 \sum_j^n \sum_k^n b_{jk}(i)}{(n-1)(n-2)} = \frac{2 \sum_j^n \sum_k^n g_{jk}(i) / g_{jk}}{(n-1)(n-2)}$$

c_{RB_i} 、 C_{AB_i} 、 $b_{jk}(i)$ 、 g_{jk} 、 $g_{jk}(i)$ ， they represent the relative middle centrality of point i 、 the absolute intermediate centrality of point i 、 the economic influence of the city on other cities、 the number of shortest paths from one city to another、 the number of paths through i between points j and k .

Social network analysis is a visual description of the characteristics of a specific social group, and the network condensed subgroup refers to the new collection formed by the relationship between various individuals in the social group according to the closeness. The number of included cities in the condensed subgroup, the connection degree between the cities in the subgroup, and the development relationship of tourism economy can be found.

3. Empirical analysis

Using network density calculation method and network cohesion calculation method, The network density and network cohesion of Wuhan urban circle are in the smallest urban circle among the six urban circles. Wuhan city point center and Jiujiang point center relative to other cities, reflects the Wuhan tourism economy in the central region in the core. The city traffic, information, trade, economy have been belonging to the main variable of tourism economy in the region, driving the surrounding city tourism economy development, and with the progress of Wuhan city influence on the surrounding cities will be greater.

Table 1. Revised gravity model for the final 0,1 matrix

City	WuHan	HuangShi	HuangGang	EZhou	XiaoGan	XianNing
WuHan	0	1	1	0	1	1
HuangShi	1	0	1	0	0	1
HuangGang	1	1	0	1	0	1
EZhou	1	1	1	0	0	0
XiaoGan	1	0	0	0	0	1
XianNing	1	1	1	0	0	0

Table 2. The overall network index of all urban agglomerations in the central region

	Network density	Network cohesion
Wuhan city circle	0.2917	0.694
City agglomeration around Poyang Lake	0.4583	0.773
Central Plains city cluster	0.4722	0.778
Wanjiang city belt	0.5893	0.798
Taiyuan economic circle	0.6	0.75
Changzhutan City Circle	0.7143	0.768
Urban agglomeration in the central region	0.1219	0.921



Figure 8 Center degree of tourism economy in urban agglomeration in central China



Figure 9 The tourism economy of the urban agglomeration in the central region is close to the central degree

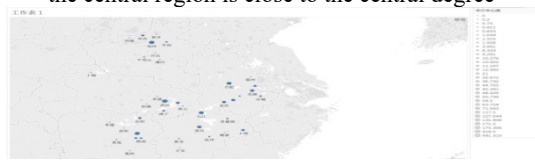


Figure 10 The Tourism Economic Mediation of Urban Agglomeration in Central Region

Thus forming the Wuhan urban agglomeration tourism economic development linkage influence. By the intermediary center degree we can learn, if you want to rapidly development the tourism economy in the central region, should be strengthening the development of Hengyang, Shiyan, Ezhou, Ji'an and other 14 cities, thus can narrow the difference in the development of tourism economy development in the central region.

In addition, the development of city tourism economy in central region plays an important role in the development of China's economy. Therefore, the condensed subgroup function of Ucinet software is used to classify the tourism economic situation of cities in central region in 2019, so as to understand the tourism economic situation of each city and to learn which stage is it in the development of the overall economy. The important position of Wuhan's tourism economy in the central region, the relative position of the last few cities is relatively bustling in the central region, which affects the comprehensive economic development and the development of tourism economy.

4. Conclusion and Suggestions

With the gradual development of the tourism integration process of urban agglomeration in central China, the development of Wuhan tourism economy should be used

to drive other cities and improve the cooperation of tourism economy among individual cities, so that the overall central region can get better common development. And Hengyang, Shiyan, Ezhou, Ji'an and other places of the tourism economy and other cities are relatively small links, the city's tourism economy development is also relatively poor. Therefore, in order to improve the overall development of tourism economy in the central region faster, we should focus on the development of tourism economy in these poor and less affected cities.

1. Enhance the connection of tourism economy among various cities. let the tourism economy in more developed areas to drive the cities with relatively poor tourism economy, building the tourism economic network of the cities in the central region, Form the integrated tourism economy in central region. The tourism resources of the central region urban agglomeration will be fully utilized, share excellent tourism resources, and form a more perfect tourism economic development.

2. Realize the spatial integration of tourism economy. Due to the weak economic connection of urban space tourism in Central China region, but the high connection of cities in each region, we should been developing the tourism economy of cities within each region, improving the output of urban transportation and tourism culture, perfecting the city tourism economy development planning.

All most of all, it is very necessary to carry out the tourism development policy and cooperate with each city government, so that jointly study the great direction of urban tourism economic common development.

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