



Research Article

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Research on construction and integration of tourism spatial structure in Anhui province

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ABSTRACT

Rational spatial structure is of great importance for the sound development of regional tourism. Anhui Province is rich in tourism resources with rapid tourism development. However, tourism development in different regions is out of balance with huge difference in inter-regional tourism. In addition, the space structure of tourism is extremely irrational. Targeting 16 cities of Anhui province as the research unit, this paper has measured the space structure of regional tourism in Anhui Province applying variable coefficient, Gini coefficient, connectivity, accessibility, regional spatial pattern, connection system of urban space, clustering analysis and other relevant methods. And, the measuring and analysis results have been dissected and interpreted in the paper. Research results indicate that the development conditions for tourism space of Anhui Province are out of balance with huge difference in developmental level and irrational spatial structure. In the meantime, the integrated development measures including enhancing the competitiveness of three major core tourism cities (Hefei, Huangshan and Wuhu), improving the regional driving and radiating capacities as well as establishing and perfecting the four major tourism areas have been proposed so as to promote coordinated development of regional tourism and provide certain theoretical and practical guidance for developing Anhui Province as a "Powerful province in tourism economy" during the 12th Five-Year Plan.

Keywords: Regional tourism, spatial structure, construction, integration, research, Anhui Province

INTRODUCTION

The rationality of regional spatial structure has a significant impact on the sound development of regional tourism. Therefore, strengthening the research and construction of regional spatial structure is of important guiding significance for the searching of advantages in regional tourism development, setting of features and direction for regional tourism development, optimization of functional configuration for tourism districts as well as the developing of tourist development strategies.

Scientific integration and optimization of tourism spatial structure in Anhui Province is conducive not only to the rational spatial structure & layout and sustainable development of regional tourism, but also to the coordinated, healthy and sustainable development of regional tourism in Anhui Province. In this way, the ultimate goal of integrating and optimizing regional tourism can be achieved so as to realize joint development in regional tourism products, narrow the difference in regional tourism, promote coordinated development between regions and maximize regional tourism development. Therefore, the research on construction and optimization of tourism spatial structure in Anhui Province must be strengthened so as to achieve rational orientation and scientific development for different regions and maximize the benefits of regional tourism economy.

RESEARCH OBJECT

This paper takes the 16 prefecture-level cities in Anhui Province as the research object to study the characteristics of the spatial and temporal disparity of tourism economy in 2002-2012. Meanwhile, based on the basic principles of

zoning, Anhui Province is divided into four major tourist regions: Northern Anhui (Bengbu City, Bozhou City, Suzhou City, Huaibei City, and Fuyang City), Hefei Economic Circle (Hefei City, Huainan City, Lu'an City, and Chuzhou City), Wanjiang (Wuhu City, Ma'anshan City, Tongling City, and Anqing City) and Southern Anhui (Xuancheng City, Huangshan City, and Chizhou City). Taking into consideration the availability and comparability of data, three key indicators for measurement of the level of tourism economy are selected in the study respectively the "total income from tourism", the "foreign exchange earnings from tourism", and the "income from domestic tourism". Among these, the "total income from tourism" is calculated by adding the "income from domestic tourism" to the product of "foreign exchange earnings from income" multiplied by the average exchange rate of that year [1]. All data are sourced from Anhui Statistical Yearbook (2002-2012).

EXPERIMENTAL SECTION

RESEARCH METHODS

This paper borrows idea from the basic research methods of regional economic disparity, and has selected variation coefficient, Gini coefficient, and Theil index as the measuring methods.

Variation coefficient: Variation coefficient is an important indicator for measurement of the relative dispersion degree of regional economies. Taking the proportion of the population of the region against that of the province as the specific weight, this paper calculates this indicator with the following equation [2]:

$$CV_w = \frac{1}{Y} \sqrt{\sum_{i=1}^n (Y_i - Y)^2 \times \frac{P_i}{P}} \quad (1)$$

Wherein: CV_w is the relative variation coefficient, Y_i is the total income from tourism of each city, Y is the average value of the total incomes from tourism of all 17 cities, P_i is the population of each city, and P is the total population of the province[3].

Gini coefficient: Gini coefficient is used to reflect the overall disparity of tourism economy [4], and can be decomposed into the two components of domestic tourism and international tourism, in order to examine the impact of each component on the overall disparity level of tourism economy. The equations for calculation and decomposition of Gini coefficient (in order to calculate the contribution rate of each of the two components to the overall disparity) are respectively as follows [5]:

$$G = \frac{2}{n} \sum_{i=1}^n iy_i - \frac{n+1}{n} \quad (2)$$

Through calculation of the weighted variation coefficients and Gini coefficients (see Table 1) of the overall income from tourism of Anhui Province using Equations (1) and (2), we can get an understanding of characteristics and inter-annual variations of the overall spatial disparity of tourism economy of Anhui Province.

From Table 1 we can see that the weighted variable coefficient has reduced from 0.8381 in 2002 to 0.842 in 2012. The coefficient presents a decreasing trend in most of the years except 2006. The changing tendency of Gini coefficient is generally the same with the weighted variable coefficient. That is, Gini coefficient also presents a decreasing trend except in 2006. But there is a slight fluctuation. From 2002 to 2012, the Gini coefficients are all greater than 0.45, which indicates that the tourism economy of Anhui Province has presented significant spatial difference, yet the overall difference in tourism economy is narrowing.

Table1 the general tourism economic inequality of Anhui from2002to2012

Year	Weighted variation coefficient	Gini coefficient	Year	Weighted variation coefficient	Gini coefficient
2002	0.8381	0.4908	2008	0.8342	0.4873
2003	0.8347	0.4946	2009	0.8563	0.4825
2004	0.8276	0.4913	2010	0.8532	0.4802
2005	0.8298	0.4896	2011	0.8565	0.4703
2006	0.8307	0.4926	2012	0.8427	0.4645
2007	0.8262	0.4870			

TOPOLOGY ANALYSIS ON TOURISM SPACE OF ANHUI PROVINCE

The common development of regional tourism relies on the high connectivity of intra-regional cities. Therefore, strengthening the research on the intra-regional spatial association in tourism is an important basis for promoting joint development regional tourism. Connectivity, accessibility, spatial form and connection system of regional space constitute the important content for the analysis of spatial association. In order to study the spatial structure of regional tourism in Anhui Province better, the author has conducted quantitative analysis applying the above measures.

Connectivity analysis: Connectivity refers to the development level of transportation network. The connectivity of regional network space can be expressed by α , β and γ indexes quantitatively [6]. In this paper, β index has been applied to measure the connectivity of regional tourism space in Anhui Province. β index is the average number of connections between various nodes in the regional space network. It is a measurement on network connectivity. For the tourism area with multiple nodes, the more traffic lines connecting different tourism nodes there are, the higher the level will be. And then, the connectivity will be higher, and it will be more convenient for tourists to travel between various tourism nodes. A high β index is a requirement and guarantee for optimizing the spatial network structure of tourism resources in the tourism area. The calculation formula is: $\beta=L/P$, [7]

In which β refers to the connectivity of transport network, L refers to the number of edges in the transport network (i.e. the number of direct connections between every two nodes), and P refers to the number of vertices in the transport network (i.e. the number of nodes). Generally, β index lies in the range of 0-3. Within this range, the greater the value is, the better the network connectivity will be [8]. After calculation, the regional β index of Anhui Province is 1.7059, which represents a superior connectivity.

Accessibility analysis: Accessibility index is the indicator to measure the moving convenience between nodes in the network (i.e. the smoothness from each node to the other nodes). It is used to represent the convenience of connection between tourism resources [9]. Accessibility index refers to the mean distance of the shortest path from one vertex to all the other vertices in the network. The calculation formula is shown as follows:

$$A_s = \sum_{i=1}^n D_{ij} / n \quad (3)$$

In the formula, A_i refers to the accessibility index of vertex I in the network, D_{ij} refers to the distance between vertices i and j, and the cumulative sum refers to the distance between vertex i and all the other vertices. As seen in formula (3), the smaller A_i value is, the higher the convenience level of this point will be.

Table 2 Analysis on Internal Accessibility of Various Cities in Anhui Province

Node	Hefei	Wuhu	Bengbu	Huainan	Chuzhou	Fuyang	Bozhou	Ma'anshan
Accessibility	241	248	283	423	339	479	581	259
Node	Huangshan	Anqing	Xuancheng	Suzhou	Lu'an	Chizhou	Huaibei	Tongling
Accessibility	470	368	344	295	474	323	432	297

As shown in Table 2, significant difference exists in the accessibility index of different cities in Anhui Province. The accessibility indexes of Hefei, Wuhu and Bengbu are around 200. Among the above three cities, Hefei has the highest accessibility at 241. The accessibility indexes of Chuzhou, Ma'anshan, Tongling, Anqing, Xuancheng, Suzhou and Chizhou are around 300, while the accessibility indexes of Huainan, Fuyang, Huangshan, Lu'an, Huaibei and Bozhou are above 400, among which Bozhou has the lowest accessibility index of 581. Taking 100 km as the vehicle speed per hour, the shortest average drive between most cities is about 2-3.5 hours. This indicates that the whole region of Anhui Province has quite good accessibility.

Analysis on regional spatial pattern: The compactness of regional tourist routes and regional spatial patterns plays a very important role in the development of regional tourism. The compact degree of regional patterns can be represented by the compact index applying the formula of $C=D/D'$, in which C refers to the compactness index, D refers to the diameter of the circle with the same area as the research area, and D' refers to the regional pattern being researched. When the regional pattern is a perfect circle, the regional accessibility reaches the best index. At this time, C takes the upper limit 1. And when the regional pattern being researched is a straight line, $C=0$. According to the formula, the compactness index of urban tourist areas in Anhui Province is about 0.657. This indicates that the regional pattern of Anhui Province is quite compact, which is suitable for integrated development of regional tourism and will promote harmonious development of regional tourism [8].

Regional space connection system: Transportation has a significant impact on the development of regional tourism. With the development of regional economy in Anhui Province and the transfer of the eastern industry, the transportation industry has been developed rapidly. The comprehensive transportation system of “Two mains, three accessibilities and one coverage” that has integrated with Yangtze River Delta has been formed with Hefei, Wuhu, Bengbu, Fuyang, Anqing and Huangshan as the main hubs of comprehensive transportation and Yangtze River and Huaihe River as the main waterway transportation channels. Provincial cities are accessible with national trunk lines. The whole province is covered by many highways that are connected with the highway network of surrounding cities in the neighboring province. In addition, air transportation service covers the whole province.

RESEARCH ON INTEGRATED OPTIMIZATION OF TOURISM SPACE IN ANHUI PROVINCE

Establish the three tourist center cities of Huangshan, Hefei and Wuhu: As can be seen from the analysis of this paper, Huangshan, Hefei and Wuhu have made considerable contributions to the development of the tourism industry in Anhui Province, which is reflected not only in their geographic location advantages, but also in their rich tourism resources, making the three cities into important tourist growth poles driving the development of the regions of Southern Anhui, Hefei Economic Circle, and Wanjiang Cities with. Therefore, the formation of Huangshan, Hefei and Wuhu into regional tourism center cities has a very important significance for promoting the development of tourism industry in Anhui Province, leading the balanced development of regional tourism economies, enhancing tourism cooperation among cities at all levels, and transforming fragmented management into joint development. The two cities of Huangshan and Hefei should be regarded as core cities in the development giving regard to their highest intensity of tourist center function and more reasonable position in the areas. The tourist area of the city band in Wanjiang region, on the other hand, should take Wuhu as the central city and build a tourist “golden triangle” together with Hefei and Huangshan, which will become the skeleton of the spatial development structure of tourism in Anhui province, and bring about the transformation of the urban system in Anhui Province into a network urban system to facilitate tourism development of the cities. In addition to the existing tourist central cities such as Huangshan, Hefei and Wuhu, Anhui Province should also strengthen the cultivation of other tourist central cities, to build them into “secondary tourist central cities”. In particular, Bozhou city should be built into the secondary tourist central city of the Northern Anhui region, which will in addition actuate the development of lower level tourist central cities by means of increment in number, enhancement of quality, and improvement of overall radioactive capacity.

Improve the transport system and expand the development space for tourism: Accelerate the infrastructure construction dominated by transportation and telecommunication network. Further integrate and optimize the urban transportation network. The construction of fast channel networks mainly including the high-speed railway network, expressway network, information highway, aviation network and ports should be further accelerated, especially the information construction. Promote the rapid development of the emerging tourism growth poles, enhance the overall strength of regions, further optimize the urban transportation network, improve the route layout towards the main tourist cities, seize important opportunities in the construction of high-speed railway and inter-city rail transit, accelerate road connection between tourism cities along the line, improve the accessibility of tourism cities and realize traffic integration of regional tourism in Anhui Province.

Strengthen regional tourism cooperation and integrate regional tourism products: Strengthen regional tourism cooperation, promote regional linkage development, implement regional cooperation strategy of mutual benefit and multi-win, take full advantage of the complementarity of regional tourism resources and the homology of culture in Anhui Province, and perform effective integration and development for tourism resources and establish rational tourism industrial chain organizations and chain network. Different cities should develop featured products according to local conditions and enhance the competitiveness of superior tourism products. The emphasis of tourism product integration should be placed on the development of industrial clusters so as to give full play to the scale effect and linkage effect of the industry. Relying on the advantages of being the economic and political center of Anhui Province and well-furnished supporting service facilities for tourism, Hefei economic circle should promote “Business travel” and “Exhibition travel”. For northern Anhui Province and the region along Yangtze River in Anhui Province, “Industrial tourism” can be developed relying on their resource advantages in heavy industry, energy industry and manufacturing industry. Cities along Huaihe River and Yangtze River may exploit “Aquatic tourism”. For southern Anhui Province, the development of “Ecotourism and leisure & recuperation ecotourism” and the other relevant products should be continued on the basis of existing sightseeing tourism and ancient town & village tourism etc. Accelerate the construction of Hefei economic circle, industrial belt along Yangtze River and urban agglomeration along Huaihe River, and form a new integrated power for regional tourism.

Integrate regional tourism market: Establish a unified tourism market system and seek common development through coordination of economic and social activities cross markets relying on the role of market mechanism. In the present situation, it is especially important to lay emphasis on the integration of the operating systems in market

economy, including the economic management system of tourist market, legal system, credit system, enterprise system and relevant systems in many aspects. The integration of system is designed to live up to the operating rules of international travel market and establish unified rules for tourism market. The operating system of market economy in northern Anhui Province varies considerably from that of Hefei economic circle, the region along Yangtze River and southern Anhui Province. Communication and cooperation should be strengthened among these regions so as to promote system integration and provide institutional guarantee for integration in the other aspects.

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REFERENCES

- [1]Chen zhibo, Wu xiaogen, *Economic Geography*, **2008**, 28(6):1064-1067.
- [2]Tang xiaoyun, *Economic Geography*, **2010**.10 (1742-1743).
- [3]Wu xiaogen, Research on Node Configuration of Domestic Tourist Routes in Jiangsu Province, **2011/05**, 120.
- [4]Zhang junmo, *Tourism Tribune*, **2010**.11, 36.
- [5]Wang degen, Research on Spatial Structure of Tourism Resources at Hulun Buir- Arxan Tourist Area, *Arid Land Geography*, **2008/03**.
- [6]Su jianjun, *Technological Economy*, **2009**, 28(7): 73 - 76.
- [7]Liu fajian, *Journal of Geographical Science*, **2010/08**.
- [8]Huang wei, *Economic Geography*, **2010/01**, 168.
- [9]Chen hao, Tourism Space Structure and Optimized Analysis of City Agglomeration at Pearl River Delta Region, *Geosciences*, **2008/01**.