Evaluation on Tourism Developing Potential and Modes of Revolutionary Base Area in Jiangxi

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Abstract—Tourism development has been recognized as an important way to bring up economic growth of revolutionary base area. This paper builds index system from four aspects, including city base, economic growth, transportation accessibility and tourism resources, and then makes an evaluation on the tourism developing potential of revolutionary base area. The research goes through analysis of spatial distribution of potential score. Some suggestions are promoted to regions according to different potential scores. The results are: (1) the distribution of tourism developing potential in researched area shows a characteristic of spindle-shaped. (2) transportation accessibility and tourism resources are two main influencing factors of tourism developing potential. (3) high potential region are mainly distributed to traffic aisle and urban, and also areas with rich tourism resources. (4) there is significant positive spatial correlation in tourism developing potential. The hot spot areas are Yichun and Xinyu, while cold spot area in South Ganzhou. As to prior developing area, potential developing area and restricted area, policymakers should promote the prior region developing ‘holistic tourism’. Government are encouraged to give help in infrastructure and tourism development to potential developing area. However, tourism development is not suitable for the restricted developing area.

Keywords: tourism industry, developing potential, development model, revolutionary base area, Jiangxi

I. INTRODUCTION

The development of revolutionary base areas has always been the focus of the party and state leaders. Nearly half of China's territory belongs to the old revolutionary area. The national key poverty alleviation counties are also concentrated in the old revolutionary areas. The problem of poverty alleviation in the old revolutionary areas is the key content of national poverty alleviation and development [1]. The study of the old revolutionary area is in response to president Xi's call for “taking the development of the revolutionary old districts on the mind.” At present, most of China's revolutionary old areas face the contradiction between economic development and tourism resources. Tourism has always been regarded by local governments as an important starting point for regional economic development [2, 3]. How to tap the advantages of the old district is an important part of the work of the state and local governments. Therefore, it is of great practical significance to study the development of tourism in the old revolutionary areas [4, 5].

The related research first studies the problem of poverty alleviation in old revolutionary areas, and explores many ways from the perspectives of destination marketing [6], cultural inheritance [7], and poverty alleviation [8]. Most studies have reached agreement on the idea that industrial poverty alleviation [9, 10] is the main way out of poverty in the old revolutionary areas, especially the “tourism+” poverty alleviation model [11]. Zhi [10] believes that the tourism resources of the revolutionary old areas are widely distributed, large in quantity and high in quality. However, there are also problems such as aimless development, shortage of management talents, insufficient promotion, and weak transportation infrastructure. On the other hand, the study of tourism development potential is also one hot topic in the academics. Various scholars have comprehensively evaluated the development potential of different tourism modes such as forest recreation tourism [12], anti-season tourism [13], ecotourism [14, 15], and cultural tourism [16] by constructing potential evaluation models. Based on the above discoveries, the old revolutionary areas are generally regarded as be rich in tourism resources. The tourism industry promotes the poverty alleviation of the old areas and is recognized by the academics. However, there are few studies on the tourism development potential of the revolutionary old areas, and they have not paid attention to the development conditions of the revolutionary old areas themselves, blindly adopting tourism development that cause waste of resources [17]. Meanwhile, most related researches use qualitative research methods [18, 19], while some studies use analytic hierarchy process (AHP) [14, 15, 20], which is more subjective to the construction of index weights, and thus easy to bring the results of the study are biased. Therefore, this study will construct an evaluation index system to comprehensively calculate the tourism development potential of the old revolutionary areas. The index weights are confirmed by analytic hierarchy process and hierarchical entropy mode. Then, the research region is divided into different areas, taking the actual situation and tourism development potential into consideration. Finally, some suggestions are provided for these areas.

We selected the revolutionary old district of Jiangxi Province as the research objective. The reason is that Jiangxi Province, as an important province of the “Rise of Central China” strategy, accounts for two-thirds of the revolutionary old districts (Fig. 1).
Studying the tourism development potential of the revolutionary old areas in Jiangxi Province can be used as a reference for the revolutionary old areas of the whole province and even the whole country.

II. METHODS AND DATA

On the basis of constructing the tourism development potential index system, our study determines the weight of each index through the hierarchical entropy model, and obtains the potential value of each county in the revolutionary old district from the tourism development potential evaluation model. Among them, the metric city traffic dependence in the indicator system will use the reachability analysis in the Geographic Information System (GIS). Finally, the exploratory spatial data analysis method is used to analyze the tourism development potential of the old revolutionary area.

A. Hierarchical Entropy Model

| Values | Description |
|--------|-------------|
| 1      | Same importance between two indicators |
| 3      | Former indicator is a little important than the latter |
| 5      | Former indicator is more important than the latter |
| 7      | Former indicator is significant important than the latter |
| 9      | Former indicator is overwhelming important than the latter |
| 2, 4, 6, 8 | Intermediate value between the above judgments |
| reciprocal | If the ratio of the importance of the i to the j is ai, then the ratio of the importance for the j to i is 1/ai |

The establishment of index weights is commonly based on the expert scoring method, namely the AHP method. This method is greatly influenced by the subjective role of experts, and the weight of the obtained indicators is often questioned by the academics. The hierarchical entropy model is a new method in recent years. It is based on the AHP method and uses the information of the decision matrix to further modify the weight of the decision maker before using the entropy technique to reduce the subjectivity of the weight. It proceeds as follows:

1. Construct a judgment matrix. As chosen in the scale comparison table (Table I), the importance of each evaluation index with respect to other evaluation indicators is compared in pairs to obtain an initial evaluation matrix.

2. Calculating the weight matrix. a. Normalize the matrix A by column to obtain a standard matrix B=(b_ij)_{m×m}. b. After normalization by row, the vector w=(w_1,w_2,w_3,…,w_m)^T is obtained. The vector w is the eigenvector of the matrix A, where w = \frac{1}{m} \sum_{j=1}^{m} b_{ij}. c. Calculate the maximum eigenvalue \lambda_{max}=\max_i \sum_{j=1}^{m} (\lambda w_i)_{ij} of matrix A. d. Calculate the consistency index CI=(\lambda_{max}-m)/(m-1), and test the coefficient CR=CI/RI. RI is the average consistency index, which can be obtained by looking up the table. CR<0.1 means that matrix A has a satisfactory consistency, and w is the obtained weight vector. CR≥0.1 means that matrix A does not pass the consistency test, and entropy technique correction is needed.

3. Corrections to the judgment matrix. a. First calculate the derived matrix C=(c_{ij})_{m×m} of the judgment matrix A, and the deviation matrix D=(d_{ij})_{m×m}, where c_{ij}=a_{ij}/w, d_{ij}=c_{ij}-1. b. Extract the maximum d_{max} of the absolute value in the deviation matrix D. When d_{max}<0, if a_{ij}>1, then a_{ij}=a_{ij}; if a_{ij}<1, then a_{ij}=a_{ij}/(1-a_{ij}). When d_{max}>0, if a_{ij}>1, then a_{ij}=a_{ij}; if a_{ij}<1, then a_{ij}=a_{ij}/(1-a_{ij}). c. Making a_{ij}=1/a_{ij}, the values of other elements are unchanged. If A’=(a_{ij})_{m×m} passes the consistency check, the operation is stopped, otherwise A’ replaces A and repeats the above steps.

4. Entropy technology correction. a. According to the standard matrix B, the output entropy E_j=−K \sum_{i=1}^{m} b_{ij}/lnb_{ij} is obtained, where the constant K=(lnm)^{-1}, and the value of E_j ranges from 0 to 1. b. Calculate the skewness difference d_{ij}=d_j/\sum_{j=1}^{m} d_j of the index x_j. c. Correct the weight vector w according to the information weight, and obtain \lambda_j = \mu_j w_j/\sum_{j=1}^{m} \mu_j w_j, \lambda=(\lambda_1,\lambda_2,…,\lambda_m)^T, that is, the weight vector corrected by the entropy technique.

B. Accessibility Analysis

Traffic accessibility is a key factor in urban development and plays an important role in tourism development [21]. Therefore, when constructing the tourism development potential evaluation system, this paper takes the practical problems into consideration and focuses on the accessibility of tourists based on railway (including high-speed rail), high-speed, and other travel modes. Based on the GIS technology, the accessibility analysis of the traffic network in Jiangxi Province is calculated. According to the "Technical Standards for Highway Engineering of the People's Republic of China", considering the density and quality of the road network in Jiangxi Province, the actual operatory speed is set as 200 km/h for high-speed railway, 150 km/h for railroad, 100 km/h for high speed, and 30 km/h for others, respectively. Furthermore, the accessibility of the county is the average within the administrative range, and the actual
impact of the high-speed entrance and exit on the convenience of transportation is also considered (Fig. 2).

Fig. 2. Accessibility analysis of railway and high-way road.

C. Tourism Potential Evaluation Model

In the process of constructing tourism development potential evaluation indicators, referring to other literature [22, 23], the system considers the influence of urban support, economic conditions, transportation convenience and tourism resources. Urban support includes distances to the prefecture-level city and other adjoin city. Economic conditions include GDP, total population, fiscal revenue and administrative area. Convenient transportation includes the average accessibility of the railway and high-speed way. Tourism resources include the number of A-level scenic spots and star hotels included in the county. The index system contains a total of 4 subsystems, 10 indicators. The weighted summation of the tourism development potential value is obtained as follows:

\[ Y = \sum_{i=1}^{n} w_i s_i \]

where \( Y \) is the tourism development potential score of a certain county, \( w \) is the index weight, \( s \) is the index score, \( i \) is the index number, and \( n \) is the total number of indicators.

D. Data Source

The data used in this study mainly includes statistical data and spatial data. Statistics are from the Jiangxi Statistical Yearbook (2018) and the China Urban Statistical Yearbook (2018). Spatial data including traffic road network, highway entrance and exit, etc. are digital and spatial calibration of the traffic network map of Jiangxi Province in 2017, and spatial reference acquisition with 1:5 million basic geographic information data.

The list of counties and cities in the old revolutionary districts is determined according to the scope of the revolutionary old districts in the province of Jiangxi Province announced by the National Bureau of Statistics. According to the administrative divisions, the total number of counties and districts is 79.

III. SPATIAL STRUCTURE OF TOURISM DEVELOPMENT POTENTIAL

A. Measurement of Tourism Development Potential Value

Based on the potential evaluation model, after using the entropy method to modify the judgment matrix once, through the consistency test, the final determination of the indicator weights is shown in Table II. In the development of tourism potential, tourism resources and transportation convenience are the key influencing factors. Calculate the tourism development potential level of the revolutionary old areas in Jiangxi Province. According to the data, the natural fracture method is divided into three categories. The number of high-value areas is 19, the median area is 34, and the low-value area is 26. Thus, the distribution of rank scale presents a spindle-shaped structure.

| subsystem                  | indicator                                  | weights |
|----------------------------|--------------------------------------------|---------|
| Urban Support              | Distance from prefectural-city (km)         | 0.035   |
|                            | Distance from the adjoin prefectural-city  | 0.017   |
| Economic Condition         | GDP (10000 yuan)                           | 0.084   |
|                            | Total population (10000 person)            | 0.047   |
|                            | Revenue (10000 yuan)                       | 0.114   |
|                            | Area (km²)                                 | 0.006   |
| Traffic Convenience        | Average accessibility of highway (min)     | 0.190   |
|                            | Average accessibility of railway (min)     | 0.146   |
| Tourism Resources          | Number of A grade attraction               | 0.232   |
|                            | Number of star hotel                       | 0.130   |

Fig. 3 shows the spatial distribution of potential values. The high potential areas are mainly located in Jingdezhen, Yingtan, Pingxiang, Yichun, and Ruijin, Ganzhou and Ganxian in Gannan. The spatial distribution of these areas presents three distinct characteristics: First, along the main roads such as the Shanghai-Kunming Expressway, the location has high accessibility and convenient transportation, which is convenient for tourists to enter and leave. Second, it is mostly distributed in administrative urban areas with better economic development, such as Pingxiang City, Jingdezhen City, Xinyu City, and Ganzhou City. These areas have high fiscal revenue levels and large local tourist markets. Third, it is distributed in famous
tourist cities with good resources, such as Jinggangshan, Wuyuan, Jingdezhen, Ruijin, Xinyu, etc. These regions have rich tourism resources and good reputation, which are the basic conditions for tourism development. In addition, the spatial distribution of the median and low-value regions is relatively uniform.

Fig. 4. Local auto-correlation map of tourism developing potential.

B. Spatial Correlation Analysis of Tourism Development Potential Value

Applying moran’s index to examine the global autocorrelation of potential value. The spatial relationship between regions is defined by the first-order neighboring matrix. As a result, the moran’s index value is 0.203 (P value=0.003), which indicates that there is positive spatial autocorrelation in the potential level of the revolutionary old districts in Jiangxi Province. In order to better reveal the spatial aggregation, a local spatial autocorrelation test is applied. The results are shown in Fig. 4.

Generally, the tourism development potential has high-value clusters in Xinyu and Yichun, and low-value clusters in southern Anhui. Specifically, there are six regions in the hot spot, namely Gao’an, Yushu, Xing’an, Xinyu, Fenxi and Anfu. The hotspots indicate that their potential levels are high and the surrounding areas are also high. This area is close to the provincial capital Nanchang, with the Da-Guang Expressway and the Shanghai-Kunming Expressway passing by. It has convenient transportation, high economic standard, and closing to the urban area. The cold spot region includes 3 cities, including Xinping, Dingnan and Xunwu. The cold spot region indicates that its own potential level is low, and the level of surrounding areas is also low. Such areas are less convenient for transportation, and the level of economic development is backward. The number of scenic spots and the number of star-rated hotels are also small.

IV. TOURISM DEVELOPING PATTERN

According to the potential score, research areas are divided into three parts, such as priority development area, potential development area and restricted development areas (Table III). Some suggestions are proposed as follows:

TABLE III. REGIONAL KIND BASED TOURISM DEVELOPING POTENTIAL

| sort count area | area |
|-----------------|------|
| Priority development zones | 19 |
| Potential development zones | 34 |
| Restricted development zones | 26 |

Priority development area. Such areas are close to prefecture-level cities, with high levels of economic development, low average accessibility of high-speed and railways, and many tourism resources. Especially with good conditions of tourism, this kind of area is included as priority development areas. It is suggested that in the background of the rural revitalization strategy, continue to increase investment in infrastructure construction in such areas and support for tourism management departments, help tourism industry development and marketing activities, conduct global tourism planning, and at the same time dig deep into the culture and local characteristics of the old district. Products, encourage local farmers to work in the tourism industry, improve the effectiveness of tourism poverty alleviation, and promote local economic recovery through tourism development.

Potential development area. Such areas are less close to the prefecture-level cities, the level of economic development is general, the average accessibility of traffic is moderate, and the tourism resources is not prominent. Considering the tourism development base, this kind of area is included as potential development area. Before developing tourism to promote economic growth, the location conditions of the regional economy, transportation and tourism resources should be upgraded. It is recommended to raise accessibility by developing transportation system, improving industrial optimization, and fully upgrading tourism resources.

Restricted development area. Such areas are far from the prefecture-level cities, the level of economic development is relatively backward, the average accessibility of expressways and railways is low, and the level of tourism resources is relatively poor. The tourism development base of such areas is still at low level. The conditions for developing the tourism industry are not yet available. The policymaker should develop other characteristic industries according to regional conditions, promote regional economic growth, actively contact the surrounding areas, and carry out resource spillovers to achieve commonality (Table IV).
The main shortcomings of our study is data limitation. The main results of the article are as follows: (1) The tourism development potential of the revolutionary base districts in Jiangxi province presents a spindle-shaped structure, and tourism resources and accessibility are important factors in the value of tourism development potential. (2) The distribution of high-potential areas is characterized by closing to traffic roadway and urban area, as well as regions with rich tourism resources, while the low- and medium-potential areas are evenly distributed within the province. (3) There is a high positive autocorrelation feature in the tourism development potential value, in which high-value clusters appear in Yichun and Xinyu areas, and low-value clusters appear in southern Ganzhou.

The revolutionary base area is an important region of concern for the state and local governments. Although the development of tourism industry is considered to promote the local economy, it still needs to adapt to local conditions. According to resource-based theory, tourism resources and traffic access are developed, and regions with relatively good economic foundation should give priority to the tourism industry and actively pursue the global tourism development model. Areas with general tourism resources and traffic conditions should consciously develop transportation and tourism quality first. However, areas with poor tourism resources, traffic conditions, and economic development are considered to be temporarily unsuitable for tourism poverty alleviation. Local governments should seek other ways to promote local economic growth. The main shortcomings of our study is data limitation. The construction of tourism development potential indicator system at county level is not comprehensive enough. In the future, with the richness of data and the gradual disclosure, further research will be carried out.

V. CONCLUSIONS

Taking the revolutionary base district of Jiangxi Province as research area, we construct the evaluation index system from four aspects: urban support, economic conditions, traffic convenience, and tourism resources. The index weight is determined by the hierarchical entropy method. The value of tourism developing in each unit are obtained according to the tourism development potential evaluation model. This paper firstly analyzes the spatial structure of the tourism development potential, and then classify the area into four kinds, including priority development zones, potential development zones and restricted development zones. Finally, it proposes targeted suggestions for policy makers.

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REFERENCES

[1] Y. Song, “Empirical Analysis on the Influencing Factors of Peasant Household Poverty: Based on the Survey of Old Revolutionary Base Areas,” Research on Development, no. 04, pp. 39-42, 2010.
[2] Danish, Zh. Wang. “Dynamic Relationship between Tourism, Economic Growth, and Environmental Quality,” Journal of Sustainable Tourism, vol. 26, no. 11, pp. 1928-1943, 2018.
[3] D. N. Aratou, X. L. Etiemme, “Industry level analysis of tourism-economic growth in the United States,” Tourism Management, no. 70, pp. 333-340, 2019.
[4] C. Y. Xu, S. X. Xu, “The Reality Reference of Getting Rid of Poverty and Becoming Better of the Old Revolutionary Base Areas: Taking yanan as an example,” Chongqing Social Sciences, pp. 40-45, 2017.
[5] X. L. Liu, X. Zhu, “Research on Population and Economic Development in a Old Revolutionary Base Area in Shaanxi Province,” Population & Economics, pp. 7-8, 2010.
[6] H. S. Hu, L. Zhang, Y. X. Shi, “Marketing Performance Evaluation of Revolutionary Base Areas’ Official Tourism Websites—Focused on 41 Revolutionary Base Areas of Jiangxi Province,” Research on Economics and Management, no. 37, pp. 121-127, 2016.
[7] W. F. Li, J. J. Jiang, “Old Revolutionary Base Area and New Vibrant Village: Cultural Inheritance and Feedback under the Rural Revitalization Strategy,” Zhejiang Social Sciences, pp. 77-83+157-158, 2018.
[8] L. Q. Liu, P. P. Zhou, “ ‘Ambition’ and ‘Wisdom’ and Support: the Key Measures of Endogenous Poverty Alleviation in Old Revolutionary Base Areas,” Social Sciences in Hunan, pp. 84-90, 2018.
[9] Z. M. Li, Y. H. Zhang, “Industrial Poverty Alleviation Model, Existing Problems and Solutions in the Old Revolutionary Base Areas — Taking the Old Revolutionary Base Areas in Southern Jiangxi as an Example,” Jiangxi Social Sciences, no. 36, pp. 61-67, 2016.
[10] R. M. Zhi, “On the Thinking of Speeding up Tourism Development in the Old Revolutionary Areas of the Taihang Mountain and the Northwest of Jin,” Economic Problems, pp. 113-117, 2013.
[11] S. Akın, M. K. Altan, F. O. Kara, et. al., “The Potential of Rural Tourism in Turkey: the case study of Cayonu,” Pakistan Journal of Agricultural Sciences, no. 52, pp. 853-859, 2015.
[12] J. R. Li, D. Xu, “Valuation on Exploitation Potential of Forest Health Tourism Based on AHP and Fuzzy Synthetic Evaluation: a case study of liaodong mountain area,” Chinese Journal of Agricultural Resources and Regional Planning, no. 39, pp. 135-142+169, 2018.
[13] Q. Y. Yu, Y. Wang, “Research on the Development Potential of Anti-Season Tourism Based on Tourism Climate Comfort——taking Zhoushan City as an example,” Qiusuo, pp. 90-92, 2012.
[14] T. H. Lian, J. Y. Wang, D. P. Cheng, “Research on the Index System and the Models for Evaluating the Ecotourism Development Potential of Nature Reserves: an example of Maoer Mountain Nature Reserve in Guangxi,” Progress in Geography, no. 29, pp. 1613-1619, 2010.

[15] W. Q. Wu, H. Shen, S. J. Ji, et. al., “Research on Evaluation Index System of Water Conservancy Ecotourism Development Potential,” Management World, pp.184-185, 2012.

[16] Y. Y. Wu, J. L. Yan, “Cultural Tourism Potential Evaluation on the National Intangible Cultural Heritages of the Southern Jiangsu,” Areal Research and Development, no. 32, pp. 157-162, 2013.

[17] P. F. Bai, A. I. Bai, “The Research on Poverty Alleviation Mechanism and Realization Path of Red Tourism in the Old Revolutionary Area of Shaanxi, Gansu and Ningxia Provinces,” Economic Research Guide, no. 24, pp. 67, 2017.

[18] L. B. Yan, B. W. Gao, M. Zhang, “A Mathematical Model for Tourism Potential Assessment,” Tourism Management, no. 63, pp. 355-365, 2017.

[19] M. Cetin, I. Zeren, H. Sevik, et.al., “A study on the Determination of the Natural Park’s Sustainable Tourism Potential,” Environmental Monitoring & Assessment, no.190, pp. 167, 2018.

[20] H. T. T. Hoang, Q. H. Truong, A. T. Nguyen, et. al., “Multicriteria Evaluation of Tourism Potential in the Central Highlands of Vietnam: Combining Geographic Information System (GIS), Analytic Hierarchy Process (AHP) and Principal Component Analysis (PCA),” Sustainability, no. 9, pp. 1-20, 2018.

[21] T. N. Van, T. Shimizu, “The Effect of Transportation on Tourism Promotion: Literature Review on Application of the Computable General Equilibrium (CGE) Model,” Transportation Research Procedia, no. 25, pp. 3096-3115, 2017.

[22] Y. X. Tang, L. Shao, W. Cao, “Valuation of Heritage Corridor Tourism Development Potential: Zhongdong Railway Case,” Planners, no. 32, pp. 96-101, 2016.

[23] Y. Z. Li, F. Y. Mou, J. Liang, “Valuation of Heritage Corridor Tourism Development Potential: Zhongdong Railway Case,” Economic Geography, no. 39, pp. 192-197, 2019.