



Research on Regional Tourism Development under the Perspective of Ecological Location Theory--Taking Guangxi as an Example

Chao Li

College of Tourism and Landscape Architecture, Guilin University of Technology, Guilin, China

1130888125@qq.com

Abstract. In the 14th Five-Year Plan, new requirements have been put forward for the development of regional tourism, but the development of tourism in Guangxi is still unbalanced and uncoordinated. The regional tourism development strategies proposed in previous studies are usually macroscopic and general, without in-depth analysis of the deep-rooted factors limiting the development of tourism in each region, and without "tailor-made" development strategies for different levels of sub-regions based on the current situation of the region. In this study, a ten-year data from 2012 to 2021 was used to establish a tourism ecological niche evaluation system for Guangxi based on tourism ecological niche theory. The entropy value method was used to determine the weights of the comprehensive indicators, and the tourism ecological status of each city in Guangxi was comprehensively evaluated. On this basis, the spatial correlation of tourism development in each city was analyzed by using the global Moran's I statistics in ARCGIS software, which was able to derive the competitive and assisting relationship of tourism among the cities in Guangxi. By studying the spatial spillover intensity between tourism regions and combining the factor analysis of geodetector, the constraints leading to the uncoordinated development of regional tourism were explored in depth. Finally, this study combines the theory of competition and cooperation with the theory of growth poles to put forward detailed strategic suggestions for the development of regional tourism in Guangxi.

Keywords: tourism ecological niche; regional tourism; spatial pattern; competitive relationships; Guangxi; geodetector.

1 Introduction

At present, the development of China's tourism industry is facing new opportunities and challenges, and is in an important strategic opportunity period in history. To cope with this development trend, at the 2016 National Tourism Work Conference, regional tourism was proposed as a tourism development strategy for the new period. The 14th Five-Year Tourism Development Plan puts forward new requirements for regional tourism development, emphasising the promotion of coordinated regional development and

© The Author(s) 2024

Q. Wu et al. (eds.), *Proceedings of the 2024 3rd International Conference on Public Service, Economic Management and Sustainable Development (PESD 2024)*, Advances in Economics, Business and Management Research 309,

https://doi.org/10.2991/978-94-6463-598-0_7

the construction of a spatial layout for high-quality development of tourism through the implementation of major regional strategies and regional coordinated development strategies. As a biological theory to study the status and role of different species in biological populations, ecological niche has its own mature knowledge system and research methods in studying the ecological relationship between different species and their behaviours, which is of great significance to the study of the competitive relationship between tourist destinations. Domestic scholars for tourism ecological niche research is relatively late, the earliest is Huang Fang (2001) proposed to apply the ecological niche theory to the field of tourism research[1]. However, in the study of competing ecological niche of tourist places, scholars are mainly based on basic theoretical research and simple theoretical applications, lacking in-depth theoretical cross-research and application, and insufficient outreach[2]. Most of the proposed regional tourism development strategies are macroscopic suggestions, without further in-depth analysis of the reasons inherent in their data representations, and then put forward more specific and detailed strategies and suggestions. This paper utilizes the ecological niche theory, combines the global autocorrelation analysis method in ARCGIS software with the factor analysis method of geodetector to study the spatial pattern of 14 cities in Guangxi, and obtains the competitive and assisting relationship of tourism between cities in Guangxi as well as the main influencing factors, with a view to further enhancing the comprehensive strength of tourism in Guangxi and the level of collaboration in regional tourism development.

2 Overview of the Study Area and Treatment of Data Sources

2.1 Overview of the Study Area

Guangxi is adjacent to Guangdong, Hunan, Guizhou and Yunnan, separated from Hainan by the sea, bordering the Beibu Gulf in the south and facing Southeast Asia. There are 14 prefecture-level cities under the jurisdiction of Nanning, Liuzhou, Guilin, Wuzhou, Beihai, Fangchenggang, Qinzhou, Guigang, Yulin, Baise, Hezhou, Hechi, Laibin and Chongzuo. Twelve hereditary ethnic groups, including Zhuang, Han, Yao, Miao, Dong, Mulao, Maonan, Hui, Jing, Yi, Shui and Gelao, live in the region, making it the province with the largest number of ethnic minorities. By the end of 2021, there were 661 A tourist attractions in the region, including 8 5A scenic spots, 307 4A scenic spots, 335 3A scenic spots, 937 travel agencies, and 419 star-rated hotels, of which 13 were five-star, and 109 were four-star. The city's total tourism revenue in 2019 was 1024.14 billion yuan. Among them, the foreign exchange income from tourism will be 3.511 billion U.S. dollars, the number of inbound tourists will reach 6,239,568, and the number of domestic tourists will reach 869.95 million. Guangxi's tourism industry showed a steady growth trend, and in 2021, due to the impact of the epidemic, the region's total tourism revenue was 906.44 billion yuan. Among them, 0.2 billion U.S. dollars of foreign exchange earnings from tourism, the number of inbound tourists received reached 61,909, and the number of domestic tourists reached 798.32 million.

2.2 Construction of the Indicator System

The scientific principle of constructing the evaluation index system is the basis for reasonably and effectively constructing the regional tourism ecological index system[3]. In formulating the ecological location evaluation index system, following the interconnectedness of each evaluation index, the systematicity and comprehensiveness of the evaluation index system, and the scientificity, credibility and measurability of the results of the ecological location evaluation[4], we construct the evaluation system of 24 indicators in 5 dimensions, including tourism resources, tourism market, socio-economics, tourism environment, and tourism traffic, from the three dimensions of the target layer, the system layer, and the indicator layer; details are shown in Table 1.

Table 1. Evaluation index system of integrated ecological niche of regional tourism in Guangxi.

Target level (A)	Systems layer (B)	Factor layer (C)
A numerous west quarter domain (taxonomy) brigade (army) travel heddle (device form warp in weaving textiles) close be born attitude classifier for honorific people	B1 Tourism resource dimension	C1 Number of national intangible cultural heritage
		C2 Number of Grade 3A scenic spots
		C3 Number of 4A scenic spots
		C4 Number of Grade 5A scenic spots
		C5 Number of national key cultural relics protection units
	B2 Tourism market maintenance	C6 Total tourism consumption
		C7 Total number of tourists received
		C8 Tourism administration
		C9 Number of star hotels
		C10 Number of travel agents
	B3 Socio-economic dimension	C11 Total retail sales of consumer goods
		C12 Total tertiary production
		C13 Disposable income per urban resident
		C14 Total telecommunications operations
		C15 Expenditure on culture, tourism, sports and media
		C16 Number of hospitals and health institutions
		C17 Number of public toilet seats
	B4 Tourism environment dimension	C18 Forest cover
		C19 Sewage treatment rate
		C20 Parkland area per capita
	B5 Tourist transport dimension	C21 Air Quality Index
		C22 Length of operational line network
		C23 Actual number of taxis at the end of the year
		C24 Road density

2.3 Data Standardisation and Entropy Weighting to determine Indicator Weights

Due to the inconsistency of the scale of the different dimensional features of the original data, making the unit of each indicator data is different, and the value will also have a large difference, does not have the calculability, the calculation results will produce extreme or negative values and so on, so the data should be dimensionless processing[5].

In this paper, the index data of 14 prefecture-level cities in Guangxi for five years from 2017 to 2021 are selected to carry out weight calculation respectively, and the average value of the obtained data is calculated, and the results of weight assignment of regional tourism ecological niche evaluation indexes of each prefecture-level city in Guangxi are finally obtained, which are shown in Table 2.

Table 2. Weights of indicators for evaluation of integrated ecological niche of regional tourism in Guangxi.

Target level (A)	Systems layer (B)	weights	Factor layer (C)	weights		
A numerous west quarter domain (taxonomy) brigade (army) travel heddle (device form warp in weaving textiles) close be born attitude classifier for honorific people	B1 Tourism re- source dimension	0.27813	C1 Number of national intangible cultural herit- age	0.03942		
			C2 Number of Grade 3A scenic spots	0.02327		
			C3 Number of 4A scenic spots	0.04121		
			C4 Number of Grade 5A scenic spots	0.14008		
			C5 Number of national key cultural relics pro- tection units	0.03415		
	B2 Tourism market maintenance	0.22731	C6 Total tourism con- sumption	0.04514		
			C7 Total number of tourists received	0.05427		
			C8 Tourism administra- tion	0.03545		
			C9 Number of star ho- tels	0.02538		
			C10 Number of travel agents	0.06707		
			B3 Socio-economic dimension	0.27032	C11 Total retail sales of consumer goods	0.05232
					C12 Total tertiary pro- duction	0.05109
					C13 Disposable income per urban resident	0.01151

		C14 Total telecommunications operations	0.03767
		C15 Expenditure on culture, tourism, sports and media	0.04147
		C16 Number of hospitals and health institutions	0.02618
		C17 Number of public toilet seats	0.05008
	0.06351	C18 Forest cover	0.01157
B4 Tourism environment dimension		C19 Sewage treatment rate	0.01054
		C20 Parkland area per capita	0.0274
		C21 Air Quality Index	0.014
	0.1608	C22 Length of operational line network	0.05952
B5 Tourist transport dimension		C23 Actual number of taxis at the end of the year	0.05913
		C24 Road density	0.04215

3 Results and Analyses of the Assessment in the Study Area

3.1 Guangxi Regional Tourism Ecological Niche Evaluation and Result Analysis

Using the potential theory of ecological niches, "potential" is the result of the accumulation of past development, learning, and environmental interactions in a tourist site; "potential" refers to the rate of renewal, the growth rate, and the ability of a tourist site to occupy new habitats, and so on[6]. The combination of these two aspects is the ecological niche width, which is reflected in the size of the ecological niche.

Table 3. Tourism ecological niche ranking of prefecture-level cities in Guangxi.

City	Integrated tourism ecological niche		tourism resource		tourist market		social economy		Tourism environment		tourist transport	
	S	R	S	R	S	R	S	R	S	R	S	R
Nanning	0.2072	2	0.1362	2	0.2052	2	0.2446	1	0.0319	14	0.3394	1
Liuzhou	0.1046	3	0.0643	6	0.0896	3	0.1449	3	0.0443	9	0.1514	2
Guilin	0.2200	1	0.3233	1	0.3188	1	0.1474	2	0.0562	6	0.0882	3
Wuzhou	0.0334	11	0.0230	8	0.0295	10	0.0272	11	0.0840	4	0.0476	8

Beihai	0.0711	4	0.0892	5	0.0656	4	0.0693	5	0.0454	8	0.0608	7
Fang-chenggang	0.0270	13	0.0051	14	0.0167	13	0.0145	14	0.2114	1	0.0275	9
Qinzhou	0.0401	9	0.0148	13	0.0207	11	0.0604	7	0.0527	7	0.0724	4
Guigang	0.0387	10	0.0164	11	0.0174	12	0.0629	6	0.0335	13	0.0689	5
Yulin	0.0536	6	0.0162	12	0.0549	6	0.0836	4	0.0606	5	0.0630	6
Baise	0.0619	5	0.1196	3	0.0471	7	0.0486	8	0.0421	11	0.0130	13
Hezhou	0.0300	12	0.0210	9	0.0305	9	0.0288	10	0.1078	3	0.0164	12
Hechi	0.0434	8	0.0573	7	0.0606	5	0.0306	9	0.0431	10	0.0168	11
Laibin	0.0167	14	0.0165	10	0.0058	14	0.0176	13	0.0375	12	0.0225	10
Chongzuo	0.0523	7	0.0973	4	0.0375	8	0.0196	12	0.1497	2	0.0120	14

According to the above theory, the tourism ecological status of 14 prefecture-level cities in Guangxi was evaluated, and the comprehensive ecological status of tourism and the ecological status score and ranking of each city in Guangxi in each dimension were obtained (see Table 3). The screened data were subjected to hierarchical clustering treatment and set to 4 levels respectively.

3.2 Analysis of Tourism Ecological Niche Results

Using the posture model of ecological position, the comprehensive ecological position value of tourism of 14 prefecture-level cities is calculated based on the ecological position value of five dimensions. In this paper, the evaluation results are divided into four levels to get the tourism development level relationship in Guangxi. Level I cities include Guilin and Nanning. Level II cities are Liuzhou. Level III cities include Beihai, Baise, Yulin and Chongzuo, and Level IV district cities include Hechi, Qinzhou, Guigang, Wuzhou, Hezhou, Fangchenggang and Laibin.

3.3 Spatial Global Autocorrelation Evaluation and Result Analysis of Guangxi Cities

Spatial autocorrelation is defined as the correlation of the same variable at different spatial locations[7]. It can test whether an element is significantly associated with its attribute values at neighbouring spatial points, and there are positive and negative correlations between them[8]. Firstly, the tourism ecological niche data of each city were inputted into ACRGIS10.7 software, and secondly, spatial autocorrelation analysis was carried out by using the global Moran'sI index tool in ACRGIS10.7 software to obtain the discrete relationship of the comprehensive tourism ecological niche of each prefecture-level city in Guangxi, and to analyze the positive and negative spillover relationship of each city.

The results of the analysis show that the tourism ecological niche of Guangxi cities shows a certain negative correlation in space, and its global spatial autocorrelation coefficient (Moran index) is -0.3171, and this index is negative, which indicates that there is a certain spatial discrete distribution of tourism ecological niche values between prefecture-level cities, and it is a negative spillover relationship, i.e., similar regions may

show dissimilar tourism ecological niche characteristics, indicating that The more developed tourism regions fail to play their own core role in driving the tourism development of the surrounding municipalities, and the more developed and less developed tourism regions form a discrete spatial distribution phenomenon, with a low degree of regionalised tourism.

4 Analysis of Geodetector Drivers

GeographicalDetector is a spatial analysis method that can be used to study the relationship between geographical phenomena and the factors that influence them[9]. The core principle is that if an independent variable has a significant effect on the dependent variable, then the spatial distribution of the independent and dependent variables will be similar[10].

Table 4. Analysis of tourism integrated ecological niche impact factors.

	tourist market	socio-economic	Tourism environment	Tourist transport	tourism resource
qstatistic	0.938139	0.813116	0.16375	0.49038	0.745625
pvalue	0.000	0.000	0.000	0.000	0.000

The q-value of the factor detection results indicates the influence of the influence factors on the discrete distribution of the current status of Guangxi's tourism integrated ecological niche, and the detection results are shown in Table 4, which shows that the P-values of the influence factors selected by the article to influence the development of the tourism integrated ecological niche are all less than 0.05, and all of them have passed the test of significance. Further analysis of the q-value of the influencing factors found that the q-value of tourism market (0.938139), socio-economics (0.813316), and tourism resources (0.745625) are all greater than 0.5, which means that these factors are the main reasons for the development gap of tourism in Guangxi.

5 Guangxi Regional Tourism Development Strategy

Nanning and Guilin are the core cities with high scores in the comprehensive tourism ecological niche and are in a dominant position. These cities should adopt tourism ecological niche expansion and coordination strategies in the process of tourism development, integrating and utilising their advantages and expanding their disadvantaged ecological niches. This includes the integration of tourism resources, the expansion of markets, the improvement of service quality, and the improvement of the tourism environment, in order to maintain its core position. Liuzhou is a node city, which is in the middle and upper level of regional tourism development, and it is easy to form tourism competition with the core city in the process of tourism development. Liuzhou should adopt the strategy of tourism ecological niche generalisation to achieve ecological niche separation, and develop diversified tourism products to form competitive advantages

on the basis of existing characteristic resources. Baise, Chongzuo, Yulin and Beihai are network cities. These cities should implement the strategy of tourism ecological niche separation in tourism resources and tourism market to avoid competition with high-level cities. At the same time, they should make up for the shortcomings in tourism market, social economy and tourism resources. Hechi, Laibin, Guigang, Wuzhou, Hezhou, Fangchenggang, Qinzhou and other marginal cities are relatively disadvantaged in tourism development. These cities should adopt the strategy of specialisation of tourism ecological niche, clearly locate the characteristic tourism resources, explore the development path of niche and boutique, and create tourism products with individuality and characteristics in order to attract tourists with specific types of needs and avoid getting involved in homogeneous competition.

6 Conclusion

Each city in Guangxi has its own advantageous ecological niche, and there are significant differences in the development of tourism in each city. The comprehensive ecological niche of tourism in general shows a decentralised layout with Nanning and Guilin as the core, and the spatial correlation between cities is low, with a negative spillover effect. The differences in the development of tourism market, socio-economy and tourism resources among cities are the main reasons for the uneven development of tourism. Therefore, based on the comprehensive tourism ecological niche value, the cities are divided into four levels, and corresponding development countermeasures are proposed: the first level cities should make use of their own advantages to radiate and drive the development of the neighbouring cities, and the second level cities should undertake the radiation of the first level cities, and adopt the ecological niche generalisation strategy to enhance the diversity of tourism resources and improve competitiveness. Avoid vicious competition. The third-level cities should adopt the ecological niche separation strategy to avoid the formation of vicious competition with the first and second-level cities. The fourth-level cities should adopt the strategy of ecological niche specialisation to give full play to the advantages of special tourism resources and form their own competitiveness.

References

1. Zhan Xue,Zhang Junxia. A review of domestic tourism ecological niche research[J]. Hubei Agricultural Science,2020,59(09):10-14+19.
DOI:10.14088/j.cnki.issn0439-8114.2020.09.002.
2. Huang F. Ecological principles for optimising tourism systems[J]. Ecological Economy, 2001, (11):19-20.
3. Guangxi Economic and Social Statistics Yearbook . . China Statistics Press ,2022.
4. LU Baoyi, MING Qingzhong. Tourism ecological niche measurement, spatial differentiation and competing strategies in border areas--Taking Yunnan Province as an example[J]. Tourism Research,2019,11(05):25-36.

5. SHAO Xinxia,HUANG Hongsheng,CHEN Meigou,et al. A study on the spatial differentiation of factors affecting ecological farming among farmers in Jiangxi Province[J]. Yangtze River Basin Resources and Environment,2021,30(11):2792-2800.
6. WANG Qizhen,ZHU Yingming. Study on the economic resilience and influencing factors of Chinese cities[J]. Ecological Economy,2021,37(10):84-92.
7. YAN Fuheng. Research on the spatial pattern and development of tourism in two rivers and one river region based on ecological location theory[D]. Jilin Agricultural University,2020. DOI:10.27163/d.cnki.gjlnu.2020.000379.
8. Journal.Tourism Sector Competitiveness in Portugal: applying Porter's Diamond[J]. Tourism & Management Studies. Volume 14, Issue 1. 2018
9. Developing regional tourism in China: The potential for activating business clusters in a socialist market economy[J]. Julie Jackson. Tourism Management,2006.
10. What makes South African Tourism competitive[J]. Engelina du Plessis; Melville Saayman; Annari van der Merwe. African Journal of Hospitality, Tourism and Leisure,2015.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

