Study on Spatial Distribution and Sustainable Development of Night Tourism Resources: Take the Central Guilin as an Example

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Abstract. The concept of sustainable development organically unifies the long-term interests and short-term interests, overall interests and local interests, economic interests and social interests of a country or region, and finally achieves common, coordinated, fair, efficient and multi-dimensional development. Based on the theory of tourism sustainable development, the paper discusses the characteristics of tourism resources composition and spatial distribution in the central Guilin from the aspects of scale, per capita share and nearest neighbor index. It is found that there are various types of night tourism resources in the central Guilin, but the supply of resources is insufficient, and the spatial distribution type is condensed, which is characterized by “central agglomeration and zero stars around”. The imbalance in regional layout exacerbates the contradiction between the supply and demand of night tourism resources. The relevant departments should take the integration, uniqueness and economy as the planning principles, and promote the sustainable development of the night tourism market in the central Guilin by issuing the night tourism planning policy, optimizing the spatial layout, deepening the night tourism planning and development, and widening the marketing channels.

1. Introduction
Night tourism is a tourist activity in a tourist destination after 6 pm[1], as an important part of the supply-side reform of tourism, having been regarded as an important indicator of the quality of life, consumption level, economic and cultural development of a city. “China excellent tourism city inspection standard (2007 revision)” regards “city night landscape and tourism experience"as the assessment standard of tourism development level. In order to promote the rapid development of night tourism in China, the opinions on further stimulating the potential of culture and tourism consumption issued by the State Council in 2019 clearly regard “vigorously developing the economy of night tourism” as an important measure to optimize the market of cultural tourism. Currently, China’s night-time tourism market has moved from spontaneous to self-conscious, it has been developed from the early lantern fairs, night markets and other forms to the integration of modern “food, travel, shopping, entertainment, sports, exhibition and performance”. However, in the supply of resources, planning and other aspects of development level is generally low. Therefore, how to scientifically plan the night tourism resources to meet the fragmented consumption demand of tourists and the multiple superposition of the night tour market is worth thinking and studying. Based on the research object of the central Guilin, this paper analyzes the types and spatial layout characteristics of night tourism resources in the central Guilin, and puts forward the sustainable development strategy of night tourism.
resources in the central Guilin, so as to provide reference for the development of night tourism in Guilin and other cities.

2. Theoretical basis
As a concept, the theory of sustainable development was first proposed in the United Nations Declaration on the Human Environment of 1972. In 1987, the World Commission on Environment and Development formally presented the theory of sustainable development in its report Our Common Future. In 1990, the Global Conference on Sustainable Development issued the draft Action Strategy for Sustainable Tourism Development, which constructed the basic theoretical framework of sustainable tourism [2]. In 1995, the World Conference on Sustainable Tourism Development adopted the Charter on Sustainable Tourism Development and the Programme Document of the Plan of Action for Sustainable Tourism Development [3], which clearly states that the essence of sustainable tourism development is “to require tourism to be integrated with nature, culture and human living environment”. As for the concept of sustainable tourism development, there is no uniform definition in the industry and academia at home and abroad. The definition given in the Tourism and Environment Series published by the World Tourism Organization (UNWTO) in 1993 is: “it means to meet the economic, social and aesthetic requirements while maintaining cultural integrity and protecting the ecological environment. It can provide a livelihood for today’s owners and guests, while protecting and promoting the interests of future generations and providing them with the same opportunities”. The domestic academic circles generally think that tourism sustainable development refers to the tourism economic development behavior which does not destroy the local natural environment and tourism resources, protects and reasonably uses the developed resources, and develops continuously on the basis of the integration of environment, society and economy [4].

3. Research design
3.1 Regional overview of the study
Guilin is located in the northeast of Guangxi Zhuang Autonomous Region in China. As an internationally renowned tourist city, there are 138.3366 million visitors in Guilin in 2019, up 26.7% year on year, the number of overnight visitors increased 14.5% from the same period last year. Guilin night tourism originated from the “Lijiang fishing and Fire Festival” held in Yangshuo in 1999, then the large-scale live performance represented by “Impression Liu Sanjie” and “Guilin Eternal Love” became the business card of Yangshuo night tourism. For nearly five years, from 2.18 days in 2015 to 2.53 days in 2019, it reflects that Guilin night tourism market is gradually favored. The central Guilin is rich in tourism resources, forming the characteristics of “green mountains, beautiful water, strange caves and beautiful rocks”. In addition, the superior geographical location and perfect infrastructure have the excellent advantage of developing night tourism. Therefore, the research area of this paper is mainly composed of four main administrative areas: Diecai District, Xiufeng District, Qixing District and Xiangshan district.

3.2 Data sources and processing
The data of this paper mainly involve the data of night tourism resources in the central Guilin, the base map data of the central Guilin, the area and the resident population. The data of night tourism resources mainly come from field investigation and literature collection. As of August 31, 2020, after careful combing, a total of 26 night tourist attractions resources data. In addition, the area of each district involved in this study comes from “Guilin Economic and Social Statistics Yearbook 2019”, and the resident population data comes from “Guangxi Statistical Yearbook 2019”.

3.3 Research methodology
Based on the basic data collection of night tourism products in the central Guilin by using the methods of literature review and field investigation, this paper analyzes the spatial distribution characteristics of
night tourism resources in the central Guilin by using the analysis methods of scale, per capita share index and nearest neighbor index (NNI).

4. Composition of night tourism resources in the central Guilin

It is found that in recent years, night tourism resources in the central Guilin has initially formed three typical models: night performing resources, scenic spot sightseeing resources and block night tour resources (table 1).

Table 1. Classification of main night tourism resources in the central Guilin

| Type                        | Products representative | Region               |
|-----------------------------|-------------------------|----------------------|
| Night Performing tour       | Legend of Xiangshan     | Xiangshan District   |
| Dream Lijiang River         |                         | Qixing District      |
| Scenic spot sightseeing tour| Night tour of two rivers and four lakes | the central Guilin |
| Dongxi Lane                 |                         | Xinfeng District     |
| Block night tour            | Zhengyang Pedestrian Street | Xinfeng District  |
|                             | Binjiang Road           | Xinfeng District     |

The experience tour of tourism performance mainly through the excavation of landscape, dance, ethnic elements and other elements of the creation of singing and dancing performance. “Dream Lijiang River” is the first real landscape performance in Asia, and has formed a normal performance mode at present. The 3D lighting show of Xiangshan Legend is unique and located in Xiangshan Park. The nighttime landscape sightseeing products in the central Guilin mainly include two rivers and four lakes (Lijiang River, Taohua River, Rong Lake, Shan Lake, Gui Lake, Mulong Lake), night boat tour of Lijiang River and Dongxi Lane-Xiaoyao Building, especially the “night boat” project has been a model of night tourism products for many years in the central Guilin. The night block tour mainly includes bars, food streets, shopping malls, sightseeing streets, cinemas and KTV around the historical block of Dongxi Lane, Zhengyang Pedestrian Street and Binjiang Road, etc., which provides diversified night leisure experience places for tourists, and is an important engine to promote tourism economic growth in the central Guilin.

In a word, the types of night tourism resources developed in the central Guilin are relatively traditional, single supply, low utilization rate of scenic spots, and slow renewal speed. There is a lack of local, experiential and intellectual types of night tourism resources such as museum night tour, sports night tour and folk night tour.

5. Spatial distribution of night tourism resources in the central Guilin

5.1 Spatial distribution structure

According to the distribution of night tourism resources in various regions (figure 1), the number of color overlapping areas is the largest, with a total of 9, accounting for 34.6%, Xiangshan District is 7, Qixing District is 6, and the number of Diecai District is the least, which is 4. Overall, the total amount of night tourism resources in the central Guilin is relatively small.

It is difficult to judge the distribution characteristics and agglomeration state of nocturnal tourism resources in the central Guilin only from the point of view of regional distribution. In order to make the conclusion of spatial distribution structure more scientific and reasonable, further calculation and comparative analysis are needed by scale analysis method and per capita occupancy index. Scale refers to the ratio of the number of night tourism resources to the regional area in each district, which can accurately calculate the spatial distribution structure of night tourism resources in the central Guilin [5]. It can be seen from table 2 that the highest scale of night tourism resources in the central Guilin is Xinfeng District, with a value of 0.17, the scale of Xiangshan District and Diecai District is 0.08, and the lowest of Qixing District is 0.07. Per capita share refers to the ratio of the number of night tourism resources in the region to the number of regional population, which can reflect whether the night tourism resources in the central Guilin can meet the needs of local residents to travel at night. And
then meet the needs of tourists, it can be seen from Table 2 that Xiufeng District is the highest, followed by Diecai District. Xiangshan District, and Qixing District is the lowest. According to the distribution quantity, scale and per capita share, the distribution gap of night tourism resources in each district is not particularly obvious, the overall spatial distribution of Xiufeng District is the best, the Xiangshan District and the Diecai District are the second, the Qixing District is relatively poor, and the overall level needs to be further improved.

![Map of night tourism products distribution in central Guilin](image)

**Figure 1. Distribution of night tourism products in the central Guilin**

**Table 2. Analysis of the scale and per capita share index of night tourism resources in the central Guilin**

| Region       | Scale | Per capita share |
|--------------|-------|------------------|
| Xiufeng District | 0.17  | 0.54             |
| Xiangshan District | 0.08  | 0.24             |
| Qixing District  | 0.07  | 0.19             |
| Diecai District  | 0.08  | 0.21             |
| Total          | 0.06  | 0.01             |

5.2 *Index of nearest neighbours (NNI)*

The nearest neighbor index is the spatial analysis method of urban geography, which was first applied to the field of plant ecology, and then introduced to the fields of urban settlement, human geography distribution analysis and so on. It represents the ratio of the actual nearest average distance between each point element and its nearest neighbor point element to the ideal expected nearest average distance, which is used to measure the spatial distribution type of the point element [5]. When the value of NNI is between 0-1, it means the state of condensed distribution, when NNI = 1, it means the state of random distribution, when NNI > 1, it means the state of uniform distribution. The formula is as follows:

$$\text{NNI} = \frac{r_i}{r_{E}} = \frac{r_i \times \sqrt{n}}{4A} \quad (1)$$

The formula: $r_i$ represents the average actual nearest distance of point elements, $r_E$ the average expected nearest distance of point elements, $n$ indicate the number of nocturnal tourism resource point elements.
elements in the central Guilin, A indicates the area of each district in the central Guilin.

By using ArcGIS software to calculate the nearest neighbor index of night tourism resources in the central Guilin. It can be seen from table 3 that the overall nearest neighbor index of night tourism products in the central Guilin is 0.79 (i.e. NNI < 1), which indicates that night tourism resources in the central Guilin are in an aggregation state. And the critical value (Z score) is -2.055 (i.e. Z < -2.58 means clustering), and the P value (significance level) is 0.040 (P < 0.01 means significant), so night tourism products of the central Guilin present significant clustering. From the nearest neighbor index of night tourism resources in each region, the NNI value of each region is greater than 1, which means that the spatial distribution type of each region is uniform distribution.

Table 3. Distribution of Night Tourism Resources in the central Guilin

| Regional          | NNI  | Z     | P     | Distribution type     |
|-------------------|------|-------|-------|-----------------------|
| Xiufeng District  | 1.624| 3.584 | 0.000 | well-distributed      |
| Xiangshan District| 1.663| 3.355 | 0.007 | well-distributed      |
| Qixing District   | 1.512| 2.398 | 0.016 | well-distributed      |
| Diecai District   | 2.597| 6.108 | 0.000 | well-distributed      |
| Total             | 0.789| -2.005| 0.040 | aggregation           |

6. The strategy of sustainable development of night tourism resources in the central Guilin

6.1 Planning policies to improve spatial distribution
The development of night tourism requires the implementation of top-level design, systematic scientific planning, steady and gradual progress. On the basis of the existing development around “bright, show, drama” to formulate a plan in line with the future development of night tourism in the central Guilin, clear future development direction and image positioning. In terms of spatial layout, it is necessary to continuously optimize the spatial structure of night tourism resources in the central, especially in the Xiangshan District and the stacked color areas, and to continuously increase the lighting lighting projects in the main streets, scenic spots, parks, city walls, etc. Through the rational integration of superior tourism resources, the key resource construction projects radiate to the surrounding areas in order to promote the development of other regions. For example, the night tour mode of Wangcheng Scenic Spot, Fubo Mountain Scenic Spot and Ludi Scenic Spot in Xiufeng District, Diecai Mountain Park and Yushan Park in Diecai District and Wayao Town in Xiangshan District, Chuanshan Park and Qixing Park in Qixing District will be opened, so as to realize the coordinated and balanced development of various regions and drive the economic development of related industries.

6.2 Attach importance to cultural experience and create quality routes
First, develop excellent night tour routes. We should seize the needs of tourists, rely on the advantages of Xiangshan scenic spot, Qixing Park, two rivers and four lakes and other landscape resources, and make full use of landscape articles to create “night tour landscape” boutique tourism routes. Aiming at the historical and cultural resources such as Gunamen and Jingjiang Palace, we should build a “night tour historic site” boutique tourism route, plan a variety of tourism and entertainment activities in the main scenic spots and streets, and carry out folk experience activities during the festival period, so as to enhance the dynamic, ornamental and participatory of night tour, improve the core competitiveness of night tour in the central Guilin, and help to coordinate the spatial distribution of night tourism products.

Second, create boutique tourism performing arts projects. Improve the quality of large-scale cultural tourism performing arts resources, such as Xiangshan Legend and Dream Lijiang River, and attract the attention of residents and tourists by activating immersive experience. The creative development of local characteristic operas, such as Guangxi opera, highlights the characteristics of
landscape culture and national culture, promotes appreciation and culture, strengthens the experience of tourists, determines the fixed performance time and stage, forms a regular development model, cultivates and creates the characteristic cultural tourism performing arts brand, and promotes the overall quality of tourism performing arts resources.

Third, attach importance to the development of tourism resources, enrich outdoor sports night tour route. The tourism demand of “night study” and cultural experience is increasing, which can improve the quality of tourists’ night experience by developing night library, museum, science and technology museum, bookstore and so on. It can also guide tourists and citizens to actively participate in night activities by increasing sports routes such as mountaineering, running, walking and fitness, so as to create a night tour atmosphere of “living and sharing”, promote the pluralistic development of cultural tourism, prolong the stay time of tourists, and promote the balance and diversity of tourism resources structure at night.

Fourth, expand the theme of the block function, extend business hours. According to the ancient Gunanmen historical and cultural block, Lijiang River riverside tourist landscape block, Rong Lake and Shan Lake waterfront tourist block, Wangcheng historical block, Longchuanping characteristic block, create different theme block brand, set up leisure and recreation places in specific streets.

7. Conclusion and prospect
Night tourism is the development trend of international tourism in the future. This paper combs the types of night tourism products in the central Guilin, and analyzes the geographical spatial distribution of night tourism products in the central Guilin by using scale index and nearest neighbor index. It is found that the type of night tourism resources in the central Guilin are mainly tourism performance, night sight seeing and block, and the spatial distribution presents the unreasonable phenomenon of “dense center and sparse surrounding”. The relevant departments should make full use of the cultural essence of regional history and natural scenery, and introduce planning policies, focusing on the development of boutique products and lines such as tourism performance, leisure sports and theme blocks. In the future research, we should deepen the research on night tourism economy, planning and other fields, use more diversified and systematic research methods, build an evaluation system of night tourism development, and formulate scientific and reasonable planning layout, so as to promote the healthy and sustainable development of international night tourism.

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