Spatial Characteristics and Influencing Factors of Night Cultural and Tourism Consumption Agglomeration Areas in China

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Abstract—China suffered from severe economic stagnation and urban decay during the COVID-19 pandemic, even public mental health was threatened. To create a favorable public consumption environment for enhancing the economic development, and meeting the needs of public life, the Chinese government has transformed and built a series of national night cultural and tourism consumption agglomeration areas as a new type of functional area in cities. The present study uses spatial analysis methods such as nearest neighbor index, nuclear density analysis, and coefficient of geographic association to quantitatively analyze the spatial distribution characteristics, equilibrium status, distribution density, and internal influential factors. The results showed the following. 1) The spatial distribution of night agglomeration areas in China is unbalanced, with a "rhombus-shaped structures, regional cluster distributions, and single nucleus aggregation points" combination of spatial distribution characteristics. 2) Eight different types of night agglomeration areas with distinctive features, large differences in spatial density, and significant geographical differentiation were identified. 3) The formation of spatial distribution patterns of night agglomeration areas was the result of the joint influence of five factors: resource endowment, economic level, transportation location, guest market, and policy environment. Understanding the current development of night agglomeration areas in China can lay the foundation for future in-depth studies on the spatiotemporal evolution of China's night tourism economy, as well as provide an urban renewal idea and experience for other global countries and regions that are facing economic crises, low urban land use efficiency, and obstruction in promoting new urbanization.

Index Terms—Night agglomeration areas, night tourism economy, public consumption environment, tourism urbanization, urban form and development mode, urban renewal.

I. INTRODUCTION

GLOBAL economic growth has been sluggish over recent years, as unemployment rates have remained high, and countries around the world have faced long-term economic challenges [1]. In response to this increasing downward pressure on domestic economies, the trend of slower consumption and sluggish investment growth, the Chinese government issued the Opinions of the General Office of the State Council on Further Stimulating the Consumption Potential of Culture and Tourism in August 2019, deciding to vigorously develop the night culture and tourism economy. Since the beginning of 2020, COVID-19 had a huge impact on the world, not only endangering public health, but also bringing about various problems, such as socio-economic crises [2], [3], shrinking tourism industries [4], employment difficulties [5], sharp declines in income [6], [7], and emotional panic [8], which further increased the pressure borne by the government, society, and the public. How to broaden the channels of economic development, alleviate declining economic growth, and guarantee public quality of life under the increasing economic downward pressure and the long-term impacts of COVID-19 have thus become an urgent issue. To this end, the Chinese government has built 243 national night cultural and tourism consumption aggregation areas (hereinafter referred to as "night aggregation areas"), the concept of which was to integrate culture, tourism, and economy in neighborhoods, cultural, sports, commercial, and touristic complexes, as well as tourist attractions and commercial areas of provincial and above cultural industry demonstration parks, etc. The Chinese government hopes that by building night aggregation areas, a new type of urban functional area will provide the public with environmental, social, psychological, health, and recreational services [9], [10] to support public health, community cohesion, and sustainable urban development [11]. The creation of night aggregation areas in China will not only meet the needs of the government and the public for rapid economic recovery, but also serve as a global response to the present economic crises, and improve the business environment. It will also provide a reference model for the global development of a night tourism economy.

To date, there are few research results on night aggregation areas across the planet; however, studies on night economy and tourism are available for reference. The term night economy first emerged in the 1990s in the context of the U.K.'s strategy to cope with inner city decline and achieve urban regeneration [12]. Beer [13] defined this as all kinds of economic activities related to leisure and entertainment industries that occur between 6 P.M. and 6 A.M., whereas as for its research content, international scholars have maintained different focuses. Research outside of China has primarily focused on night violence and crime

[14], policing [15], group behavior [16], [17], [18], [19], leisure [20], cultural experience [21], [22], economic vitality [23], and transportation [24]. Within China, the number of correlated studies has gradually increased in recent years, specifically revolving around overviews of the night economy [25], development status [26], policy mechanisms [27], innovation paths [28], development potential [29], differences in the development of night economies across different regions [30], [31]. Multiple sources of research data have been employed, such as Baidu search index [32], electricity Big Data [33], temperature [31], night light [34], [35]. Geographically, research regions around the country are relatively extensive, but largely focused on economically developed regions along the southeast coast, including Jiangsu, Zhejiang, and Fujian, with less attention paid toward the northeast and northwest China. To date, most research methods have been a combination of qualitative and quantitative, including comparative studies [26], case studies [36], as well as importance performance analysis (IPA) [37], and nearest neighbor index [38].

Night tourism is an important part of the night economy, and spans a wide range of research perspectives: First, regarding the concept of night tourism and corresponding tourists, scholars have established different definitions [39], [40]. Second, the carriers and modes of night tourism products [41] include astronomical tourism, dark night parks, rural starry sky, and other forms of tourism carried out where the night sky is the primary resource [42], [43]. Elsewhere, tourism can also be based on a city's illuminated landscape, such as night markets, or night leisure and entertainment venues [44], [45]. From the perspective of night tourism participants, three types of subjects have been prioritized: night tourists, related industry workers, and indigenous residents. Among them, night tourists have received the greatest amount of research attention, and the studies include their travel motivation [46], travel behavior [47], travel flow [48], [49], night tourism perception [50], satisfaction [51], [52], and willingness to revisit [53]. Regarding the impact of night tourism, research has been carried out mainly in terms of positive and negative impacts, with the former including boosting the economy [54], employment growth [55], improving the tourism product system [56], satisfying tourists' needs [57], improving infrastructure [58], and promoting rural revitalization [59], whereas the latter are mainly the impacts of night tourism on local community residents [60], [61], [62], including increased crime rate, environmental pollution, and class conflict. From the perspective of research methods, interviews [60], textual analysis [42], field surveys [46], [63], comparative studies [64], case studies [65], two-stage mediation model [66], Delphi method [67], and IPA analysis [68] methods were mostly used.

The research results on night economy and night tourism have been abundant across nearly all sectors, but most are based solely on the descriptive analysis of night tourism economic activities, and there is a lack of in-depth analyses of its influencing factors, driving mechanisms, and evolutionary laws, while research results on national-level and large-scale night tourism destinations remain lacking as well. Accordingly, this study takes Chinese night agglomeration areas as the research sample, and using the nearest neighbor index, nuclear density estimation, and other
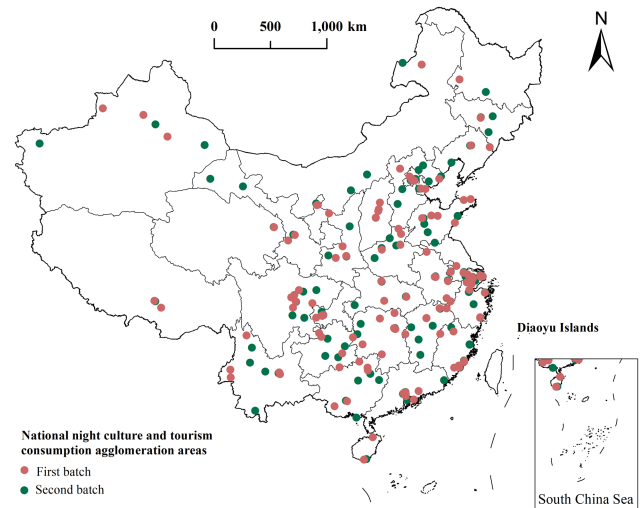

Fig. 1. Location distribution of the agglomeration area.

spatial analyses methods, quantitatively assessed their spatial distribution characteristics, equilibrium status, and distribution density, in addition to identifying and sorting by type to reveal correlated spatial differentiation patterns. Using methods such as coefficient of geographic association and buffer zone analysis to dissect the intrinsic influencing factors, this research will not only provide references for China to further develop its night tourism economy, but can introduce China's experience and ideas of developing night tourism economies to other countries and regions in the world.

II. MATERIALS AND METHODS

A. Study Area

Due to the large number, the Chinese government has decided to select night aggregation areas in two batches. This article takes the night aggregation areas of 32 provinces, cities, autonomous regions, and construction corps in China (excluding Hong Kong, Macao, and Taiwan) as the research object, and Fig. 1 shows the locations of the total of 243 night agglomeration areas in the first two batches.

B. Data Sources

The list of night agglomeration areas comes from the official website of China's Ministry of Culture and Tourism. The latitude and longitude coordinates of each night agglomeration area and the administrative center points of each prefecture-level city were obtained from the coordinate picking system of Baidu Map. The maps were downloaded from the standard map service website of the National Bureau of Surveying and Mapping Geographic Information Service. The data for domestic major highway traffic were derived from the National Basic Geographic Information System, whereas that for national 5A Scenic Area (the highest level of tourist attractions in China) were obtained from the website of the Ministry of Culture and Tourism, while economic, social, and population numbers of each province and

Data	Date	Source
List	2021 2022	https://mct.gov.cn/
Latitude and longitude	2022	https://api.map.baidu.com/lbsapi/getpoint/index.html
Map of China	2021	http://bzdt.ch.mnr.gov.cn/
Major roads	2021	http://www.ngcc.cn/ngcc/
5A Scenic Area	2022	http://bmfw.www.gov.cn/lyjgj5Ajjqcx/index.html
Statistical Yearbook	2021	http://www.stats.gov.cn/tjsj/ndsj/2021/indexch.htm

city in 2021 were derived from China Statistical Yearbook 2021. Details are shown in Table I.

C. Methods

1) Nearest Neighbor Index: The nearest neighbor index is a method of measuring the geospatial distribution of "point elements" to determine the structure of the studied objects using their mutual proximity [69]. Here, the average nearest neighbor index was used to measure the aggregation and dispersion of the spatial distribution of night agglomeration areas (expressed as point elements) across a national spatial scale according to the following equation:

$$R = R_i/R_e = \frac{1}{u}\sum_{i=1}^{u} d_i(S_i) \times \frac{1}{2\sqrt{u/A}} \tag{1}$$

where R is the nearest neighbor index, R_i denotes the actual average nearest neighbor distance of night agglomeration areas, R_e is the theoretical nearest neighbor distance, $d_i(S_i)$ represents the distance from the night agglomeration areas to their nearest night agglomeration areas, A is the geographical area of China, and u is the number of night agglomeration areas. Usually, when the nearest neighbor index is < 1, a clustered distribution type is recorded, whereas when the nearest neighbor index is > 1, a diffusion pattern is observed. The nearest neighbor point index boundary can be further divided into $R \leq 0.5$ for aggregation distribution, $R \geq 1.5$ for uniform distribution, $0.5 < R \leq 0.8$ for aggregation-random distribution, $0.8 < R < 1.2$ for random distribution, and $1.2 \leq R < 1.5$ for random-uniform distribution.

2) Geographical Concentration Index: The geographical concentration index indicates the concentration degree of the distribution of spatial geographic elements within a certain region, and the average geographical concentration index is the average number of each regional element that is distributed in a certain region. Furthermore, the comparison results between the two can reflect the concentration degree of the spatial distribution of each night aggregation areas at the provincial level [70]

$$G = 100 \times \sqrt{\sum_{i=1}^{n}\left(\frac{P_i}{Q}\right)^2} \tag{2}$$

$$\bar{G} = 100 \times \sqrt{n\left(\frac{\bar{P}}{Q}\right)^2} \tag{3}$$

where G denotes the geographical concentration index of night aggregation areas within a province, $\bar{G}$ is the geographical concentration index of night aggregation areas under the absolute average distribution, P_i represents the number of night aggregation areas in the ith province, $\bar{P}$ is the number of night aggregation areas in each province under the absolute average distribution, Q is the total number of night aggregation areas, and n is the total number of provinces. If $G > \bar{G}$, it indicates that the night aggregation areas are in a concentrated layout; otherwise, the layout is scattered. Moreover, the larger the value of G, the more concentrated the distribution of night agglomeration areas, whereas the smaller the value of G, the more dispersed the distribution (G ranges from 0 to 100) [64].

3) Imbalance Index: The imbalance index allows for analysis of the balanced distribution of night agglomeration areas in each province, as well as applying the method for calculating the concentration index in the Lorenz curve to derive the imbalance index S for the night agglomeration areas [64]

$$S = \frac{\sum_{i=1}^{p} Y_i - 50(p+1)}{100 \times p - 50(p+1)} \tag{4}$$

where p is the number of provinces and districts, Y_i is the cumulative percentage of the ith position, and S is between 0 and 1, when $S = 0$, it indicates that the night agglomeration areas are equally distributed in each province and district, and when $S = 1$, it indicates that the night agglomeration areas are concentrated within a certain province or district.

4) Nuclear Density Analysis: Nuclear density analysis is used to portray the spatial density characteristics and distribution trends of a study object, and can effectively reflect the degree of nuclear influence on the surrounding area [71]. In the present study, the dispersion or clustering characteristics of the spatial distribution of night agglomeration areas were measured by nuclear density analysis as follows:

$$f(x) = \frac{1}{qh}\sum_{i=1}^{q} k\left(\frac{x - x_i}{h}\right) \tag{5}$$

where $\left(\frac{x-x_i}{h}\right)$ is the kernel function, h is the bandwidth, and $x - x_i$ is the distance from the night agglomeration area (x) to the measurement marker agglomeration area (x_i).

5) Coefficient of Geographic Association: The coefficient of geographic association is used to analyze the degree of linkage in the spatial distribution of study elements [72], and can be used in the present study to analyze that between the distribution of night agglomeration areas and the regional economy, 5A scenic spots, etc.

$$L = 100 - \frac{1}{2}\sum_{i=1}^{m} |S_i - P_i| \tag{6}$$

where L is the coefficient of geographic association, S_i is the proportion of night agglomeration areas in the ith region to the total, P_i is the proportion of GDP and the number of 5A scenic spots in the ith region to the total. The value of L ranges from 0 to 100, where the larger the value, the stronger the geographic linkage between the two.
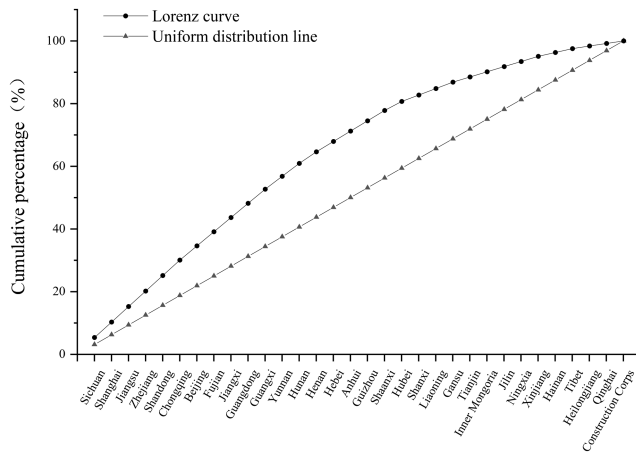
Fig. 2.   Lorenz plot of displaying spatial distribution of night agglomeration areas.

Fig. 3.   Spatial distribution of nuclear density.

III. RESULTS

A. Overall Spatial Distribution of Night Agglomeration Areas

1) Spatial Distribution Characteristics: The nearest neighbor index R of the distribution of night agglomeration areas was calculated in ArcGIS $v.10.7$, and it was obtained that $R = 0.446659$, $z = -16.535547$, $p = 0$. It can be seen that the nearest neighbor index passed the Z score test and p value, with a confidence level $> 99\%$. In terms of the specific distribution type, the calculated $R = 0.446659 < 0.5$, indicating a cohesive spatial distribution trend of night agglomeration areas.

2) Balance of Spatial Distribution: The geographical concentration index G of night agglomeration areas was 19.76, and the overall distribution was relatively scattered. If the 243 night agglomeration areas were equally distributed among the 32 provinces, municipalities, autonomous regions, and construction corps of China (excluding Hong Kong, Macao, and Taiwan), the number of night agglomeration areas in each province and region would be 7.6, and the resulting geographical concentration index here was $\bar{G} = 31.25$ $(G < \bar{G})$ indicating that the distribution of night agglomeration areas was more dispersed at the provincial scale.

The number of night agglomeration areas varies widely in each province and region of China. The unbalanced index S of night agglomeration areas was relatively low, indicating that night agglomeration areas with certain popularity and influence were generally formed in each province and region. The Lorenz curve of the distribution of night agglomeration areas in each province and district (see Fig. 2) reveals an obvious upward convex form, further indicating that its spatial distribution is unbalanced.

3) Spatial Distribution Density: Spatial distribution of night agglomeration areas by nuclear density was similarly measured in ArcGIS (see Fig. 3). It revealed that they varied greatly with the Heihe–Tengchong Line (it is the dividing line of China's population development level and economic and social pattern) forming the key boundary, with a distribution pattern of dense in the southeast, and sparse in the northwest. The four core
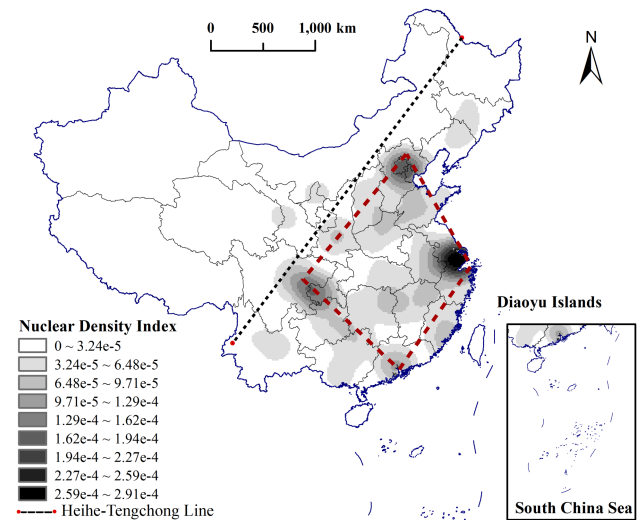
regions with the highest density were the Yangtze River Delta, Beijing–Tianjin–Hebei, Chengdu–Chongqing city clusters, and Guangdong Greater Bay Area. Combined, these four core areas maintain a large population, high economic vitality, strong source market, and have unique conditions for the development of the night tourism economy. Furthermore, these areas display strong resource deployment, and the resources can be optimally integrated to the greatest extent, so that the night agglomeration in these areas form obvious "diamond structure" concentrations. This structure basically includes all the regions with high densities, including the North China Plain, the middle and lower reaches of Yangtze River Plain and other regions. In addition, areas such as the junction of Jilin and Liaoning and Kunming in Yunnan form relatively independent single-core high-value points, which are located in areas with rich tourism resources and frequent economic activities, but due to the relatively low level of development in the surrounding areas, they cannot form large-scale developments and often exist in isolation. In general, the night agglomeration areas form a spatial distribution pattern of "diamond-shaped structure, regional cluster-like distribution, and single-core aggregation points."

B. Structural Characteristics of Night Agglomeration Areas Type

1) Type of Night Agglomeration Areas: This study referenced the classification of tourism resource categories in the 2017 edition of "Classification, Survey and Evaluation of Tourism Resources" (GB/T 18972−2017), as well as the classification of types in the declaration form of night agglomeration areas. Furthermore, the present research drew on the studies (35,70) of classification criteria of tourism resource attributes and functions, in addition to consulting the opinions of field experts by systematically sorting out the development characteristics of the 243 night agglomeration areas. Accordingly, eight types of agglomeration areas were defined: Historical
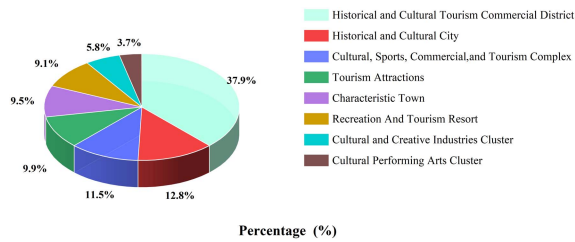
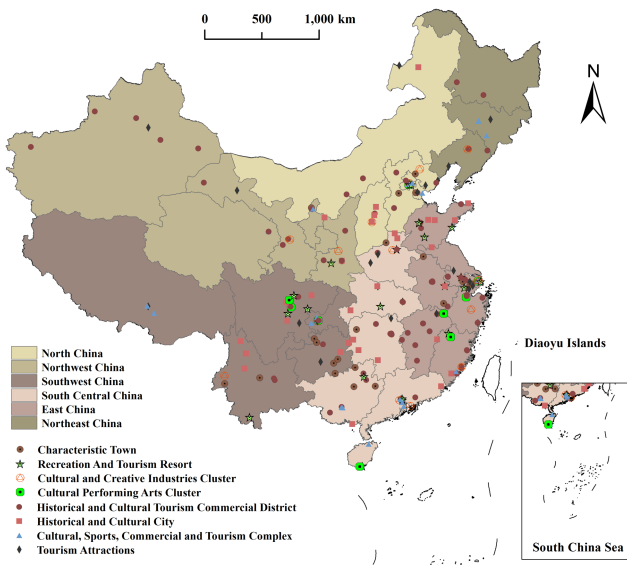Fig. 4.   Proportions of each type of night aggregation areas.

Fig. 5.   Distribution of night agglomeration areas types throughout six regions of China.

and Cultural Tourism Commercial Districts, Historical and Cultural Cities, Cultural, Sports, Commercial and Tourism Complexes, Tourism Attractions, Characteristic Towns, Recreation and Tourism Resorts, Cultural and Creative Industries Clusters, and Cultural Performing Arts Clusters. The proportion of each type of night agglomeration areas is shown in Fig. 4.

1) The Historical and Cultural Tourism Commercial District comprised the highest proportion (37.9%). It was further divided into two types: Historic and Cultural Districts and Leisure Commercial Areas. Historic and Cultural Districts are a piecemeal traditional planning area, where historical buildings are concentrated in patches, reflecting the traditional pattern and historical appearance more completely and authentically, thereby better preserving cultural heritage. Both the Leisure Commercial Area and the Historic and Cultural District are different in nature and form. Specifically, the Historic and Cultural Districts focus more on historical heritage and cultural connotation, and are less equipped with consumption carriers, whereas the leisure commercial area has a stronger commercial component, a huge flow of people, and a higher ratio of consumption carriers. For example, the Nanjing Fuzimiao–Qinhuai scenic belt is a style district integrating landscape gardens, temples, schools, and residential areas,

which not only contains the historical and cultural deposits of Nanjing's urban development for > 2000 years, but contributes to a prominent commercial atmosphere in the modern development as well.

2) Historical and Cultural Cities accounted for 12.8% of the total, and was second only to the Historical and Cultural Tourism Commercial Districts. Historical and Cultural Cities are those with deep cultural heritage, and where significant historical events have occurred. With the promotion of the concept of deep integration of culture and tourism, China is vigorously promoting the protection and utilization of historical and cultural cities, and actively enhancing the radiation and influence of culture and tourism with ancient cities forming the center, thereby helping historical and cultural cities become an important carrier of night tourism experiences. For example, the Lijiang Ancient City, Yunnan Province is a typical historical and cultural city with a high image, visibility, and influence. Lijiang Ancient City has created a series of night cultural consumption brands with various forms, rich content, and compelling attractions, forming a strong cultural and tourism integration night economic consumption atmosphere, with obvious agglomeration and brand effects.

3) Cultural, Sports, Commercial, and Tourism Complexes account for 11.5% of the total, and represent one of the important forms in the process of development and industrial restructuring of China's cultural and tourism integration projects in recent years. Indeed, most cities have made efforts to enhance these complexes to drive and stimulate the iteration and innovation of new consumption, thus establishing new landmarks for the city. For example, "This Has Mountain" project in Changchun City, Jilin Province, Hongqi Street is a 24 h economy indoor project integrating culture, tourism, food, business, and leisure. The structure is 30 m high, circling from the slope to the top of the mountain, creating various atmospheric and realistic landscapes along the way, in addition to food and beverage services, carnival area, cinema block, theater, bookstore, café, cultural and creative block, museum, gym, pavilions. It can fully satisfy the demand of consumers. Notably, Changchun is located in a high latitude region with cold and long winters, and such an indoor project can better meet the public's needs for night activities in cold conditions.

4) Tourism Attractions account for 9.9% of the total. China is a vast country with numerous 5A scenic spots. Scenic spots suitable for night tourism activities must maintain several conditions, such as substantial flows of nightly visitors, high quality tourism resources, and complete service facilities; accordingly, 24 scenic spots were selected, such as the Bund Scenic Area in Huangpu District, Shanghai, and Jinji Lake Scenic Area in Suzhou.

5) Characteristic Towns account for 9.5% of the total agglomeration areas, and are mainly typified by adherence to the two major development structures of characteristic and tourism industries, with unique style, appearance, and fashion. With the promotion of the night economy

model, these regions have driven a new development of night cultural tourism consumption. The Characteristic Towns selected for the night agglomeration areas are mostly commercial towns with a history and cultural lineage of > 100 yr, and remain well preserved, with large-scale residential buildings. It is a kind of settlement formed between an ancient city and an ancient village, mostly evolved from the commercial market town, and gradually developed into a functional area of local special industries, and cultural tourism; for example, Suzhou Zhouzhuang Ancient Town, Chongqing Magnetokou Ancient Town, Tianjin Yangliuqing Ancient Town, etc.

6) Compared with traditional scenic spots, Recreation and Tourism Resorts have multiple consumption attributes, such as cultural experience, leisure, vacation, tourism trade, fashion, shopping, etc. It is also a suitable place for developing night agglomeration areas. Among the 243 samples, there were 22 Recreation and Tourism Resorts (9.1%), and it can adapt to the needs of public leisure and tourism, promote and lead the transformation of the tourism industry from sightseeing-based to leisure and tourism-based, as well as provide diversified and high-quality leisure and tourism product areas for the public. In the future, the development rate of these types of night agglomeration areas will remain high; for example, the core area of Shanghai International Tourism Resort, Guangzhou Changlong Tourism Resort, and Qingdao Mangrove Resort World.

7) Cultural and Creative Industry Clusters account for 5.8% of the total, and transforms certain industrial heritage and factory buildings into industrial tourism products and related consumer businesses that are in demand for cultural or artistic creative means. For example, The 798-751 Art Cluster in Beijing, The II Factory Cultural and Creative Cluster in Chongqing, and The Hongmei Cultural and Creative Park in Shenyang. The model here is to make use of the original site, integrate regional resources, link the catering support and industrial offices, etc., so that they can be organically integrated with the cultural industry, tourism, and modern service industry, in addition to becoming a fashionable leisure and consumption scene for tourists.

8) Cultural Performing Arts Clusters account for 3.7% of all agglomerations, making them the least numerous. Despite its small number, each night agglomeration area is of high quality, and has a novel, more advanced model than the general tourist destinations. For example, Beijing Tianqiao Performing Arts District, Shanghai Hengfu Music Block, Chengdu Music Place, and Hangzhou Songcheng. As one of the typical business forms of cultural tourism integration development in recent years, cultural tourism performing arts have become the important driving force for many scenic spots or cities to retain tourists and drive night consumption, also one of the main attractions for night tourism consumption among many overnight visitors.
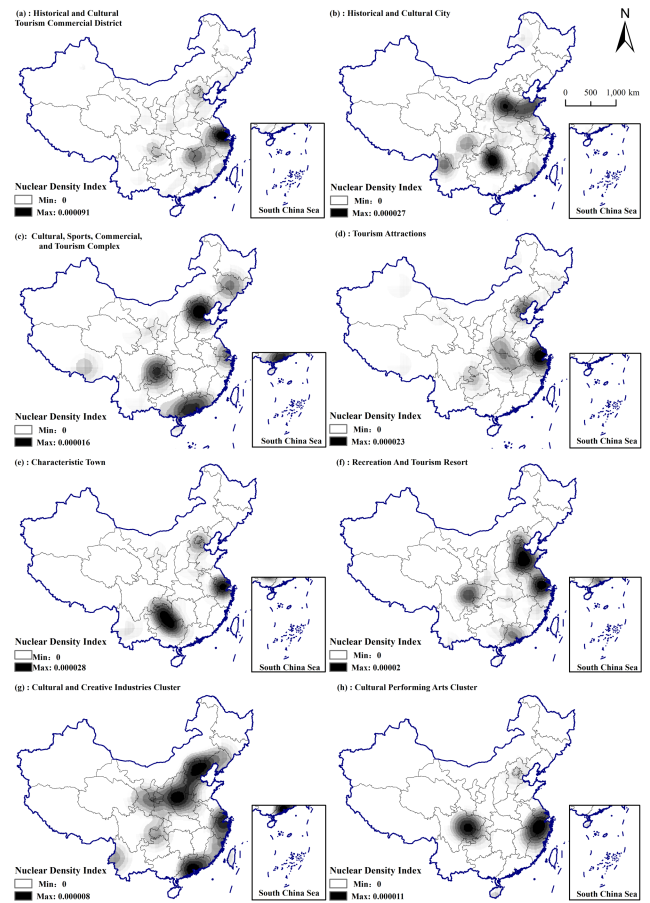

Fig. 6. Nucleation density of different types of night agglomeration areas in China.

2) Spatial Distribution of Different Types of Night Agglomeration Areas: The six main regions of China contain all types of night agglomeration areas (see Fig. 5). However, there are non-equilibrium patterns in the spatial distribution of the various types of night agglomeration areas. To better understand the imbalance characteristics, the nuclear density of eight types of night agglomeration areas was measured (see Fig. 6). It was found that the spatial density of different types of night agglomeration areas varied greatly, with obvious type separation and substantial geographical differentiation. Historical and Cultural Tourism Commercial Districts, aside from the largest number of in East China (37) and the smallest number Northeast China (5), the density of agglomeration areas in the other four regions was relatively balanced. Historical and Cultural Cities and Characteristic Towns were distributed across all regions except for the Northeast and Northwest, where they were fewer. Cultural, Sports, Commercial, and Tourism Complexes form three high-density areas in the North, South, and Southwest, while Tourism Attractions and Cultural and Creative Industry Clusters showed a more balanced overall distribution. Recreation and Tourism Resorts showed high densities in the coastal area of Southeast China. Lastly, the low number of Cultural Performing Arts Clusters was primarily distributed in East and Southwest.

a: Historical and Cultural Tourism Commercial District
b: Historical and Cultural City
c: Cultural, Sports, Commercial, and Tourism Complex
d: Tourism Attractions
e: Characteristic Town
f: Recreation And Tourism Resort
g: Cultural and Creative Industries Cluster
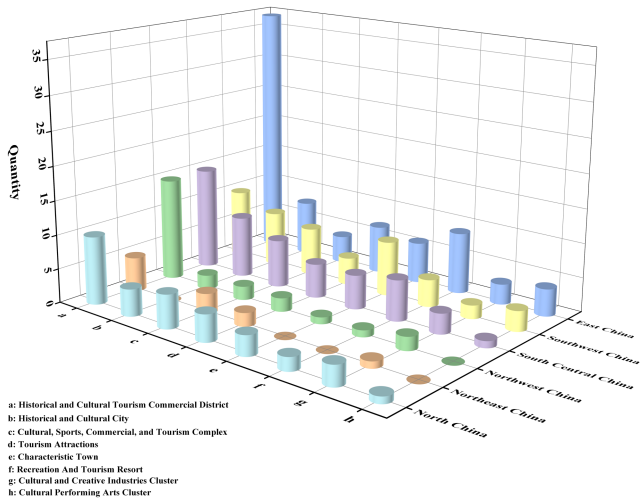h: Cultural Performing Arts Cluster

Fig. 7. Distribution of the number of different types of agglomeration areas by region within China.

A three-dimensional bar chart (see Fig. 7) was created to analyze the proportion of each type of night agglomeration area within each region. It was revealed that Historical and Cultural Tourism Commercial Districts were most abundant in the North, East, Central, Southwest, and Northwest China. Although the main type of agglomeration in Northeast and Northwest was also Historical and Cultural Tourism Commercial Districts, all the other types here were relatively few, indicating that the night tourism economic products in these two regions are mainly single neighborhood tourism, with lower development levels compared to other regions. Cultural and Creative Industry Clusters and Cultural Performing Arts Clusters were the most advanced among the eight types of night agglomeration areas, mainly being concentrated in East, Southwest, and Northern China, especially in Shanghai, Chongqing, Chengdu, and Beijing, thereby indicating that the development level of night tourism economy in these regions was markedly higher than that in other regions. Notably, the diversified structure of night agglomeration area types can measure the healthy state of night tourism economic development within a region. East China has an abundance of night agglomeration areas of all kinds, with the greatest concentration of Historical and Cultural Tourism Commercial Districts. Specifically, the types of night agglomeration areas in Central and Southwest China also showed diversified characteristics, and the difference between the proportion of each type was small, indicating that East, Central, and Southwest China were particularly rich and diversified in night tourism products, with the correlated economic development in a healthy and balanced state.

IV. ANALYSIS OF INFLUENCING FACTORS

Differences in politics, economies, and resources will bring different impacts on the regional distribution of tourism destinations, and the distribution of night agglomeration areas will also be affected accordingly. Drawing on previous research results [73], [74] and referring to the requirements of night agglomeration area selection, this study proposed the five dimensions of resource endowment, economic level, transportation location,

guest market, and policy support to evaluate the influence degree of each contributing factor on the spatial distribution of night agglomeration areas, with the help of GIS buffer zone analysis and coefficient of geographic association.

A. Resource Endowment

Tourism resource endowment is an important factor affecting correlated development in a region, and the richness and grade of tourism resources directly determine the pattern of tourism industry development in a region. Under the current tourism resource evaluation and management standards in China, the level of tourism resource endowment is mainly measured through scenic area grades, and relevant statistics are obtained from the official website of the Chinese Ministry of Culture and Tourism, which shows that there were 318 national 5A scenic areas as of 2022. The coefficient of geographic association can be used to analyze the degree of connection between the spatial distribution of night agglomeration areas and that of high-quality tourism resources in each province and region. Here, the number of 5A scenic areas was selected as an indicator to judge the strength of tourism resource endowment of a province and region, and the influence of the endowment on the spatial distribution of night agglomeration areas was detected using the coefficient of geographic association. Based on (6), the coefficient of geographic association was calculated as $L = 99.84$, indicating the connection between the two factors was very close. Furthermore, the scenic area-dependent night agglomeration areas accounted for 9.9%, indicating that the tourism resource endowment has an important influence on the type and spatial distribution of night agglomeration areas. Due to this, 5A scenic areas basically represent the highest level of tourism development in a region, and their surrounding areas are rich in various types of tourism resources. The facilities are perfect, and some of the night agglomeration areas can rely on the radiation of 5A scenic areas to achieve complementary resources and shared sources of tourists.

B. Economic Level

In Fig. 3, it can be seen that the night agglomeration areas were mainly distributed in a "diamond structure" east of the Heihe–Tengchong line, which largely includes the areas with the highest level of economic development in China; thus, it appears that the level of regional economic development is an important factor affecting the distribution of night agglomeration areas. To fully verify this notion, this study selected the per capita GDP of each province and region in 2021 as the index of economic development level, and used the coefficient of geographic association analysis ($L = 99.79$). It showed that the spatial distribution of night agglomeration areas and economic development level was highly consistent (i.e., the grouping effect of night agglomeration areas and regional economic development was extremely strong).

C. Traffic Location

The differences in location conditions and traffic accessibility of night agglomeration areas across different regions also directly affected the formation and layout of night agglomeration
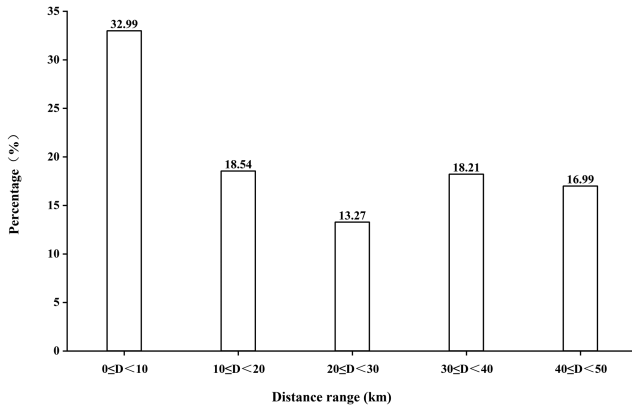
Fig. 8. Distribution of buffer distances between night aggregation areas and main roads.

Fig. 9. Distribution of buffer distance between night aggregation areas and source markets.

areas. Considering the closed nature of railroads, and the fact that roads are the most accessible and flexible among all transportation methods, this study employed the main road lines as the primary axes, and conducted a buffer analysis on the distance between night agglomeration areas and road transportation lines. The average speed of ordinary roads in Chinese cities is generally 40–60 km/h. With a distance of 50 km per hour, taking 10 km as the buffer unit, five consecutive nodes within 0–50 km [75] were selected to calculate the number of night agglomeration areas within each range and generate the distribution percentage map of these areas within different distance segments (see Fig. 8), according to which the influential traffic conditions on spatial layout was judged.

The buffering results showed that road travel can reach nearly one-third of the night agglomeration areas within a 10 km buffer; moreover, all the night agglomeration areas were also distributed within a 50 km buffer of the main roads, indicating that the traffic location conditions have a significant influence on the spatial distribution of night agglomeration areas. The main reason is that good traffic conditions can reduce the travel cost of tourists, enhance their travel experience, and also prolong their stay in night agglomeration areas; therefore, strengthening road construction will help promote the layout and development of night agglomeration areas.

D. Guest Market

The distance between the urban guest market and the night agglomeration areas is also an important factor affecting its development potential, assuming that the guest source of the night agglomeration areas mainly come from the administrative center of the prefecture-level city and above where it is located. Furthermore, considering that most tourists are constrained by both time and economic costs, 100 km is an important watershed for which tourists can implement their travel behavior around the city [76]. Here, the multiring buffer analysis module of Arc-Toolbox in ArcGIS was used for analysis across 10 km intervals, using the administrative center above the prefecture level as the buffer center. The buffer zone distribution map was spatially overlaid with the vector map of the night agglomeration areas
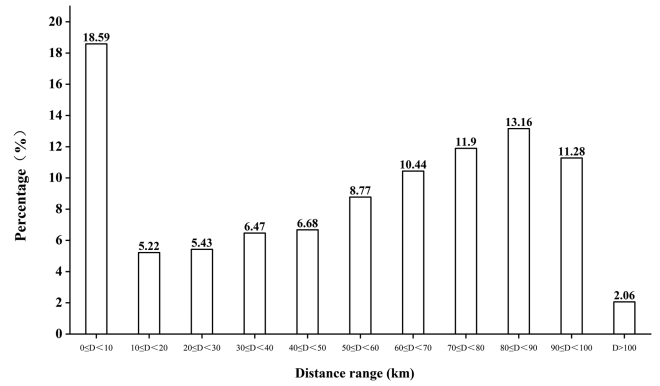
distribution, and the distance from the night agglomeration areas to the prefecture-level administrative center was calculated. The distribution ratio of the night agglomeration areas in different distance segments was also generated (see Fig. 9).

Approximately 98% of the night agglomeration areas fell within 100 km, indicating that the overall distance of these areas is better, and the locational advantages are more obvious. In terms of distribution frequency, the locations were mostly concentrated within 10 km from the prefecture-level administrative center (accounting for 18.59% of the total), making it the first density zone of night agglomeration areas, with more commercial streets, cultural and sports complexes, as well as cultural and performing arts agglomerations distributed within this range. At 10–50 km from the center, there is a trough. Generally, this distance range contains the edge or suburban areas of a city, where various types of agglomeration areas are less distributed here. There is a peak again in the range of 60–100 km, accounting for 46.78% of the total agglomerations, making it the second highest density zone. This range generally contains the distant suburbs of a city, with a high number of historical and cultural cities, characteristic towns, and tourist attractions.

E. Policy Support

The prosperity of night agglomeration areas cannot be separated from the strong support of all Chinese governmental levels, and there are a certain number of these areas distributed in all provinces and regions, which to a certain extent indicates their ubiquity developed throughout China; however, the support given by each region to promote the development of the night economy varies. For example, Shanghai promulgated the guiding opinions on promoting the development of the night economy as early as April 2019, using financial policies to increase the developmental support. Alternatively, Beijing has launched measures to promote consumption growth through a prosperous night economy, optimize night public transportation services, and develop night tourist consumption internet celebrity gathering spot. Guangdong Province also launched efforts to accelerate the development of circulation to promote commercial consumption policy measures, while encouraging a certain night economic base of local cities to build new, renovate,

and upgrade the bar, coffee, and restaurant streets, as well as to create a number of night economic demonstration shopping districts. A series of initiatives in Shanghai, Beijing, and Guangdong have effectively stimulated the innovative capacity and vitality of night cultural tourism development, providing a policy guarantee and innovative environment for the high-quality innovative development of night tourism. Alternatively, the number and type of agglomeration areas in Northwest and Northeast China were relatively small, which also has an important relationship with the developmental concept and policy innovation environment in the region. Therefore, the policy environment, innovation capacity, and development concept of night tourism development in different regions were important factors affecting the spatial differentiation of night agglomeration areas.

V. DISCUSSIONS

A. Background of the Emergence of Night Agglomeration Areas in China

The current main contradiction in Chinese society is between the people's growing need for a better life and imbalanced or insufficient development. This contradiction is reflected in the tourism industry as traditional tourism methods have been difficult to meet the growing recreational demand of tourists [77]. With the gradual upgrading of consumption and high-quality development of tourism, residents' demand for night leisure and entertainment is also increasing, and new forms of tourism, places, facilities, and products must be continuously developed and refined [40]. Moreover, China has experienced increased economic downward pressure in recent years [78] with high unemployment; thus, livelihood issues must be addressed as well. Meanwhile, the impact of the global COVID-19 epidemic has led to a certain degree of spatial isolation in China [79], causing public anxiety, depression, and other mental health problems [2], [8], providing a contrasting pressure to the increasing public demand for tourism and leisure. Coupled with the fact that some problems [80], [81] have emerged during the implementation of new urbanization in China in recent years, such as the similarity of town development patterns and the loss of traditional culture [82], the National Development and Reform Commission of China has been exploring new paths for urbanization development, aiming to maintain sustainable and healthy economic development. Tourism, as a modern emerging service and comprehensive industry, has certain advantages over industrial development paths; thus, vigorously developing tourism and taking the path of tourism urbanization provide a "nonindustrial" model option for urbanization paths, which is very important and worthy of promoting it as a new urbanization developmental direction.

B. Construction of Night Agglomeration Areas in China

In the above multiple contexts, based on the characteristics of proximity and high frequency of tourists' trips under the influence of COVID-19 [40], the Chinese government found a new and suitable way to meet the current development environment; namely, to expand the scale of national cultural and tourism consumption, prosper the market, create employment, and preserve the excellent traditional culture by building night agglomeration areas capable of meeting the public's need for a better life. Mullins [83] first proposed the concept of tourism urbanization in 1991, defining it as a process and phenomenon that promotes the transformation of local industrial structures, community forms, and social evolution through the development of tourism to promote economic development [84], [85], [86], which in turn promotes urbanization. Night agglomeration area is a phenomenon in which economic transformation and industrial reconfiguration occur in the original scenic area, neighborhood, or town driven by tourism development, and represents a new and special form of tourism urbanization.

C. Implications for the International Community

The creation of night agglomeration areas in China can not only promote urban development and stimulate industrial vitality, but also meet the needs of the government and public for rapid economic recovery. By sorting out the spatial distribution, characteristic pattern types, and influencing factors of night agglomeration areas in China, and also revealing the causes of the observed spatial distribution patterning, this study can clarify the current developmental situation of China's night agglomeration areas, lay the foundation for future in-depth research on the spatiotemporal evolution of China's night tourism economy, and provide a Chinese concept and experience for international regions facing economic crises, suffering from the risk of COVID-19, or suffering from stagnated urbanization to emulate.

This study found that the construction of night agglomeration areas in China is determined by a combination of influencing factors, such as resource endowment, economic level, transportation location, guest source market, and policy environment. The Chinese government has developed areas with different endowments and conditions into night agglomeration areas of different types and modes in accordance with the principle of adapting to local conditions, and has achieved relatively good results. In this case, other countries and regions in the world should be prudent when vigorously developing night tourism economies according to their own resource endowments, development levels, and other actual conditions. Furthermore, the decision-making layer needs to provide clearer guidelines, not only to develop the economy, but also to focus on the creation of a healthy environment, as well as the sentiments of people, including local residents, tourists, and practitioners of the night tourism economy.

D. Limitations

This study reveals the spatial distribution characteristics and patterns of night agglomeration areas. Due to their history being relatively brief, some of the research data or information used were not comprehensive. Accordingly, this research did not conduct a deep analysis for time being, while the analyses of the scale structure, economic benefits, development paths, and multitemporal spatial and temporal evolution of night agglomeration areas require further attention in future research. In addition,

future research will be selecting typical representative night agglomeration areas, conducting field research, analyzing their role mechanisms in promoting tourism urbanization and local industrial restructuring, and focusing on night tourism stakeholders, while conducting in-depth discussions and research on the happiness of night agglomeration areas' indigenous residents, as well as the experience of night tourists. Thus, a scientific basis for the healthy development of night agglomeration areas can be achieved.

VI. CONCLUSION

With the continuous development of society and the accelerated pace of urban life, night tourism economy has become an important component of urban business and tourism, and the corresponding night agglomeration areas represent a key organizational form and effective carrier for the implementation of tourism urbanization in China. In this study, the spatial distribution characteristics, equilibrium posture, and distribution density of night agglomeration areas were quantified and analyzed in ArcGIS using the nearest neighbor, geographical concentration, nuclear density estimation, and imbalance indices. On this basis, the types and patterns of night agglomeration areas were systematically sorted, while their spatial distribution characteristics and patterns are revealed. Finally, the influencing factors were identified using the coefficient of geographic association and buffer zone analysis, and the following conclusions were drawn.

1) China's night agglomeration areas are spatially unbalanced, with an overall cohesive distribution of more in the Southeast, and less in the Northwest. Taking the Heihe–Tengchong Line as the boundary, the spatial divergence on both sides was significant, and the quantity difference between provinces and regions was also significant, indicating the heterogeneity of distribution. The Yangtze River Delta region, Beijing–Tianjin–Hebei region, Chengdu–Chongqing urban agglomeration, and Guangdong Greater Bay Area were the four top points, forming a "diamond structure" which basically included all high-density regions. In general, the national night agglomeration areas form a spatial distribution pattern of a "diamond-shaped structure, regional cluster-like distribution, and single-core aggregation points."

2) The Chinese government has created various types of night agglomeration areas based on the principle of localization. This study classified them into eight categories with distinctive characteristics, spatial density differences, and significant geographical differentiation among each type of agglomeration area: Historical and Cultural Tourism Commercial Districts were widely distributed in the country, and were the most dominant type; Historical and Cultural City and Characteristic Towns were less common in the Northeast and Northwest; Cultural, Sports, Commercial, and Tourism Complexes were mostly distributed in North, South, and Southwest; Tourism Attractions, Cultural and Creative Tourism Attractions, and Cultural and Creative Industry Clusters were more evenly distributed across the country; Recreation and Tourism Resorts were mainly located in the Southeast coastal region of China,

whereas Cultural Performing Arts Clusters were fewer in number, and mainly distributed to the East and Southwest China.

3) The spatial distribution pattern of night agglomeration areas is the result of many factors, for which this study analyzed five factors: resource endowment, economic level, transportation location, guest market, and policy support. It was found that night agglomeration areas and economic development level, transportation location conditions, maintained relatively strongly consistent distributions. The night agglomeration areas in economically developed and favorable transportation location conditions have strong agglomeration effect. From the perspective of resource endowment, the night agglomeration areas can be developed by relying on the radiation influence of the rich tourism resources and perfect tourism facilities of 5A scenic spots to realize resource complementarity and tourist source sharing. From the perspective of the guest market, almost all the night agglomeration areas are distributed within 100 km of the guest market, with good overall distance accessibility and obvious location advantages. Moreover, the policy environment, innovation ability, and development concept of night tourism development in different regions were also important factors affecting the development potential of night agglomeration areas.

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