



# Research on the Sustainable Development of Urban Night Tourism Economy: A Case Study of Shenzhen City

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As the process of cultural tourism integration gradually deepens, determining how to tap into the night tourism economy has become a new focus of the industry. Among the core cities in the Guangdong-Hong Kong-Macao Greater Bay Area, Hong Kong, and Macau have formed a more mature model of sustainable development of night tourism economy, whereas it is not obvious in mainland cities. The current research themes in this field are more scattered and have not yet formed a study with depth and breadth. Accordingly, this study selects the modern international metropolis Shenzhen as the research object. First, based on system theory and sustainable development theory, it uses hierarchical analysis and a comprehensive evaluation model to conduct a comprehensive assessment of the sustainable development of the tourism economy in Shenzhen from 2011 to 2021. Second, through the cluster analysis of day-time and night-time tourism economic patterns in Shenzhen, it explores the sustainable development path of Shenzhen's night-time tourism economy. Research results show that each major indicator of sustainable development of the tourism economy in Shenzhen maintains stable and fast growth momentum, and the rise of the night-time tourism economy injects a new momentum for sustainable development. As an extension and supplement of the day-time tourism economic form, the night-time tourism economy includes three tourism economic forms: excursionistic, cultural immersion, and host and guest leisure. Finally, the researcher proposes corresponding sustainable development strategies for different forms of the night-time tourism economy. Empirical findings of this study have important reference value for the related research on the night tourism economy.

**Keywords:** night tourism economy, hierarchical analysis, comprehensive evaluation model, comprehensive evaluation model, sustainable development

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## INTRODUCTION

The night-time economy is an economic term originally developed in the UK to alleviate the empty nest phenomenon in cities at night and to achieve urban regeneration (Mao et al., 2020). The UK formally implemented the night-time economy strategy in 1995, followed by a strong push in the US (Gui, 2019). In China, the night-time economy started in the early 1990's and has developed from the early lighted night markets into a multifaceted night-time consumer market

including food, tourism, shopping, entertainment, sports, exhibitions, and performances (Yue and Jing, 2013). As the process of cultural tourism integration gradually deepens, determining how to tap into the “night tourism economy” becomes the focus of the industry’s attention. Night tourism economy refers to the city residents and tourists from 18:00 of the day to 6:00 of the next day, in the city to carry out tourism-based cultural and economic activities (Liu, 2019). In August 2019, the General Office of the State Council of China issued a document clearly stating that by 2022, more than 200 national night-time cultural and tourism consumption clusters will be built. Local governments have successively introduced corresponding policies to stimulate the high-quality development of the night tourism economy and inject a new impetus for economic growth (Li and Wang, 2014). The night-time tourism economy can be seen as a continuation of daytime economic life. It not only meets the growing material and cultural consumption needs of residents but also becomes an important channel for domestic and foreign tourists to perceive the local culture and experience the local lifestyle (Dai Bin, president of the China Tourism Research Institute; Dai and Yang, 2019).

In the study of the night tourism economy, foreign countries focus on developing night tourism, stimulating night tourism consumption, and activating the night tourism economy (Bossema et al., 2018). Additionally, Chinese research in this field focuses on the proposal of countermeasures for the sustainable development of the night tourism economy. Wang and Yao analyzed the current situation and problems of the night economy in Lushunkou District, Dalian, and based on this investigation, they made suggestions for the local promotion of quality night tourism and sustainable development of the night tourism economy (Wang and Yao, 2018). With the gradual saturation of the city’s day-time tourism economic activities, night-time tourism economic activities are starting the “extra-long standby” mode for the cultural tourism industry (Gui, 2019). Hong Kong uses the night view of Victoria Harbor, restaurants, and bars, among others, to show the world the international night “Pearl of the Orient;” Macau’s colorful theme “fireworks show” and other night projects trigger the night tourism consumption market in Macau; Shenzhen, a young international city, commemorated the 40th anniversary of reform and opening up with Shenzhen Futian Square’s “Brilliant New Era” light show, which interpreted the four chapters of the story, including the City of Mountains and Seas, the Window of Reform, the Capital of Innovation and the Realm of Harmony, attracting 250,000 people in a single day and largely stimulating the pride and happiness of residents and tourists (Zhong, 2019).

In the core cities of the Guangdong-Hong Kong-Macao Greater Bay Area, Hong Kong, and Macao have a prominent position in the development of the night tourism economy and have formed a more mature night tourism economic sustainable development model, which is otherwise not obvious enough in the mainland cities. Shenzhen, as a modern young metropolis in the city cluster of the Greater Bay Area, with the night light show and other government projects into the night economy became active. Coupled with the policy incentives of the Guangdong-Hong Kong-Macao Greater Bay Area and the

early demonstration zone. With the expansion of the night-time economy market, local night-time tourism is taking shape. While companies have developed related night tourism products, the night tourism economy has started to rise and show a spurt in development. Based on regional tourism economic development theory and sustainable development theory, this study adopts a combination of qualitative and quantitative methods to comprehensively assess the sustainable development trend of Shenzhen’s tourism economy and explore the development path of the night tourism economy through clustering analysis of Shenzhen’s night tourism economy to provide a reference for the sustainable development of urban night tourism economy and other related studies.

## LITERATURE REVIEW

### Current Situation of Night Tourism Economic Research

This study compares the theoretical studies related to the sustainable development of the tourism economy. With the help of the CiteSpace bibliometric tool, we review the domestic and foreign journal literature related to the sustainable development of the tourism economy at night from a visual and systematic perspective to comprehensively and objectively sort out and interpret the current state of research in this field (Chen et al., 2015) and subsequently lay a good theoretical and knowledge foundation for localized research in Shenzhen.

### Theoretical Basis of Sustainable Development of Night Tourism Economy

Sustainable development is an organic system with ecological sustainability as the basis, economic sustainability as the condition, and social sustainability as the goal, where these three elements of “ecology, economy, and society” are highly and closely connected (Xiao et al., 2020). It emphasizes the sustainability, commonality, and fairness of development, and its connotation includes economic, ecological, and socially sustainable developments. Sustainable tourism development refers to the sustainable development of the tourism economy based on environmental, social, and economic effects without destroying the local natural environment, damaging the existing and potential tourism resources, making rational use of tourism resources, and protecting the existing resources already developed (Joshi et al., 2020). In the 1990’s, Guan Falan introduced system theory into regional tourism research, pointing out that the regional tourism system is an open system with a dissipative structure, consisting of multiple subsystems (Li, 2013). In the regional tourism economic development, regional supply is the premise of tourism development, market demand is the driving force of tourism development, regional security is the key to tourism development, and regional support capacity is the support of tourism development (Cheng, 2018). Meanwhile, the two-wheel-drive model constructed by Xu and Chen analyzes the composition of the tourism industry development system and its influencing variables from the perspective of supply and demand (Li, 2013).

## Current Situation of Night Tourism Economic Research

In terms of the current situation of night tourism economic research in China, the author searched and screened 232 pieces of literature available for analysis in the China Knowledge Network (CNKI). First, the annual distribution and changing trends of the literature show that the research on the night tourism economy in China has shown rapid growth in recent years, and the reasons for the change in domestic night tourism research trends are largely related to national or local policies. The main themes and focuses of domestic research are night tourism and the night economy. The research on night tourism in China is guided by the national policy, and its theme is closely extended outward around the night economy and combined with the analysis of the frequency value and centrality value of keywords (Li et al., 2017), products that can meet the needs of tourists from the perspective of tourism. The specific research includes product definition and classification (Yu, 2018), product structure optimization (Liao, 2020), and research on the design or development of special tourism products including night markets (Li, 2014) and museum night tours (Cheng, 2019). Fu (2016) introduced the night economy strategy into the city night lighting Planning, proposed the tourism city night lighting planning, should be the night scene as a production method to explore its economic potential, through the integration of local tourism resources, the development of night tourism economy, tourism cities to achieve a win-win situation to enhance the image of the city and prosperity of the city economy (Fu and Gan, 2013).

In terms of the analysis of the current status of foreign research on the night-time tourism economy, we searched and screened 79 documents available for analysis in the Web of Science core collection. In recent years, the total number of relevant foreign studies has shown a slow-growth trend; at the same time, compared with domestic night-time economic research, the number of foreign studies is much smaller, which presumably indicates that the night-time economy has not yet attracted much attention abroad, and there is much room for research and development. Second, given that the generation and development of night tourism are largely dependent on the local economic resource endowment, other studies exist in this research area in countries with higher economic levels. Finally, compared with the domestic counterpart, foreign night tourism research topics present more perspectives and can be divided into four directions: night tourism economy, night tourism experience (Pinke-Sziva et al., 2019), night tourism impact (Lopez et al., 2018), and night tourism support (Bellis et al., 2003). Specifically, in the night tourism economy theme, most studies centered on developing night tourism, stimulating night tourism consumption, and activating the night tourism economy (Kumar and Upadhyay, 2017); in the night tourism experience theme, researchers have explored the night tourism experience and perceptions of tourists from various perspectives (Lee et al., 2020), in the theme of night tourism impacts, researchers have examined the impacts of night tourism for tourist areas, most of which are negative (Silver and Hickey, 2001; Wesemann, 2005; Scafetta and Mazzarella, 2018) the literature on night tourism

support examines technologies, facilities, or countermeasures that can help tourists travel at night (Song et al., 2020; Zmyslony and Pawlusinski, 2020).

## Relatively Mature Night-Time Economic Development Model

The night-time economy, as part of socio-economic development, is subject to changing patterns in line with the patterns of human society (Zeng et al., 2015). In the process of derivation, the economic development model is influenced by factors such as religious beliefs in the social landscape, social system, market quota, technological progress, human creativity, and the availability of a mature business middle class; additionally, economic development shows unique flexibility and vitality (Di and Han, 2009). The night-time economic development model is based on culture, and specific reference can be made to the mature night-time economic development model (Gui, 2019). Relatively mature night-time economic development models include traditional night-time economic development models and modern night-time, economic development models.

### Traditional Night-Time Economic Development Model

The traditional night-time economic development mode is categorized into three types: night-time tea-drinking economic mode, night-time bar economic mode, and night-time cafe economic mode. Their evolution and development have different histories and processes and contain the cultural heritage of different commercial areas. Tea is the most valuable cash crop and circulated up in the world from the British love of tea. At night in a tea club or cafe, the aroma of tea is not only behind the economic and political wrestling but also the history and cultural changes. The term bar emerged in recent times as a night-time hangout and authentic business venue as well as the center of local nightlife and night culture. From the end of World War II to the present, bars have begun to pursue branding, chains, and diversification in the global economy. A fixed bar model does not exist. It is influenced by a variety of factors such as geographic location, social groups, and purpose, and takes on different forms. Bars and city nights are the same, reflecting the heart and soul of people. Coffee is the second most valuable trade item after oil all over the world and largely contributes to the country's economic development. In developed markets, coffee origin awareness has a huge impact. The names of the coffees on the shelves such as Kenya, Costa Rica, Java, etc., are purposely designed to stimulate customers' interest in buying. It's like a tourist brochure, often with accompanying pictures, used to stimulate the customer's imagination about the country. For example, Japanese consumers like Tanzanian coffee but not Kenyan coffee, mainly because Mount Kilimanjaro and Japan's Mount Fuji are very similar, many Japanese businessmen processing Tanzanian coffee-like to print the image of Mount Kilimanjaro on the packaging. Coffee shops symbolize a culture of slowing down and being quiet and refined. The charm of coffee lies in the meaning it gives to life, which is to stop and enjoy leisure time.

## Modern Night-Time Economic Development Model

The modern night-time economic development model includes the economic development model of the entertainment industry and the night-time economic development model in the Internet era. With the development of the entertainment economy, entertainment industries such as night-time film and television entertainment, night-time festivals and tourism events, bars, and nightclubs have developed into the fastest growing sectors in many countries. In China, consumers are beginning to shift from the pursuit of food and clothing to the pursuit of the enjoyment of the spiritual world. Based on obtaining the basic needs of life, the demand for entertainment on holidays, the need for interpersonal interaction, and the different demands of individuals provide the soil and huge business opportunities for the development of the entertainment industry. European and American cities take the development of the entertainment industry as an opportunity to integrate entertainment elements with local cultural industries and drive the development of related industries such as tourism, catering, transportation, and logistics, and eventually achieve urban renaissance (Danilko, 2019). In the era of mobile Internet, people's needs are not only on the material level but also on the spiritual level of happiness and a sense of belonging. With the development of Internet technology, people's life and way of thinking keep changing, while the group differentiation in the niche era and the different cultural backgrounds of the social population directly lead to different habits and ways of thinking (Evans, 2012). Based on cultural differences, the urban night-time economy presents a diversity of businesses, such as different styles of cafes, different themed pubs, and pastime activities for different age groups. People use the Internet to target groups with different consumption needs, develop a niche, create personalized and novel night programs more precisely (Gruner and Ansorge, 2017), and develop the night tourism economy.

## Night Tourism Economy Activity Types and Supporting Characteristics of Cities

### Relatively Fixed Types of Night Tourism Economic Activities

Driven by new technologies, the type of night tourism economic activity is gradually changing from traditional to modern, meeting the more diversified needs of modern people. In the process of evolution, relatively fixed night-time economic activities persist. Researchers have summarized relatively fixed types of night-time tourism economic activities from traditional and modern perspectives, and the traditional ones are mainly divided into three categories: cultural tourism festivals (Tang, 2009), night-time tourism performances (Muresan et al., 2016; Xiong and Wen, 2019), and commercial street tourism night markets (Hsieh and Chang, 2006). The content of traditional night-time tourism economic activities is closely integrated with the culture of the tourist place, enhancing the interaction between tourists and locals, which is one of the important ways to develop the night-time economy and spread local characteristics and culture (Giordano and Gwiazdzinski, 2018; Eldridge, 2019). Typical cases include the Harbin Ice and Snow Cultural

Tourism Festival, Guilin "Qian Gu Qing" live performance, and Taiwan Night Market (Tu and Liou, 2009), among others. Modern emerging night tourism economic activities show diversified forms, which researchers have categorized into five major segments: night culture (Tu and Liou, 2009), night light show (Tony, 2003), night tourism (Eldridge, 2019), night accommodation (Huang and Wang, 2018), and night entertainment (Xu, 2014). Moreover, the tourism economic activities of each segment can be organized into different forms of night tourism economic activities.

### Typical Cities of Night Tourism Economic Activities

The researchers identified five cities where night-time culture is typical, including Tokyo, where globalization and authenticity blend perfectly; New York, where art and individuality gather; Taiwan, where character and originality coexist; Hong Kong, the "Pearl of the Orient;" and Changsha, where people and the world are entertained. The night culture of Tokyo's Azabujuban shopping district combines modernity and tradition, making clever use of local resources and history to maintain the district's strong "Japanese feel" (Henderson, 2017) while allowing visitors to experience a trendy and modern atmosphere at all times; the strong artistic inculcation, the aesthetic perception of people in New York City is also invariably influenced, forming more original, personalized, and niche pursuits, bringing more artistic beauty to the night culture of New York (Won et al., 2020); the night market culture in Taiwan Province of China is rich in local characteristics and authentic local flavors, allowing visitors to truly immerse themselves in ordinary Taiwanese society (Hsieh and Chang, 2006); The night view of Victoria Harbor, which gives Hong Kong its reputation as the "Pearl of the Orient" and one of the top three night views in the world (Huang and Liao, 2017); the uniqueness of Changsha night culture lies in the teahouse culture, concert hall culture, and bar culture (Liu, 2017), as the representative of recreation and leisure, everyone can find the same interest group in Changsha at night and enjoy together. In the night culture, Changsha has achieved to "entertain myself, entertain people, and entertain the world" (Song et al., 2011).

In summary, this study constructs an evaluation index system for the sustainable development of the tourism economy in line with Shenzhen through the relevant theories of regional tourism system theory, the two-wheel-drive model of the tourism industry, and sustainable development. A comprehensive and systematic review of domestic and international research in the field has not yet been developed with depth and breadth through bibliometric analysis software. The relatively mature development models of the night-time economy include the traditional night-time economic development model and the modern night-time economic development model. Night tourism economic activities are relatively fixed in the form of cultural tourism festivals, night tourism performances, and night markets for tourism in shopping streets. The typical cities of night tourism economic activities are all based on culture, driving the sustainable development of the city's night tourism economy (Xu, 2019). No scholars have yet used a combination of qualitative and quantitative methods to explore in-depth the economic patterns, sustainable development trends, and strategies of urban

night-time tourism based on a comprehensive assessment of the sustainable development level of the city's overall tourism economy (Zhang et al., 2020). Therefore, the empirical findings of this study will be an important reference and reference value for the night tourism economy and other related studies.

## RESEARCH DESIGN

### Research Case Sites

This study chooses Shenzhen, China, as the case study site for the sustainable development of the night-time tourism economy for two reasons. First of all, Shenzhen is a special economic zone of China, a national economic center city, an international young metropolis, and an emerging immigrant city located in South China, one of the four central cities in Guangdong-Hong Kong-Macao Bay Area. In addition, it is currently making every effort to build a pioneering demonstration area of socialism with Chinese characteristics, which has strong economic and environmental advantages for the development of the night tourism economy. Second, with the gradual saturation of daytime tourism economic activities, the night-time tourism economy becomes active. Shenzhen government's investment in the National Day theme light show and other night projects, coupled with the Guangdong-Hong Kong-Macao Bay Area and the policy incentives of the early demonstration zone, enterprises to increase the development of night tourism products and investment, the local night tourism took shape, the night tourism economy began to emerge and show a spurt of development. Among the core cities in the Guangdong-Hong Kong-Macao Greater Bay Area, both Hong Kong and Macau have developed a more mature model for sustainable development of the night-time tourism economy, while the mainland cities are less obvious. Shenzhen's high work intensity, fast-paced life, a high percentage of young people, and long duration of summer compel Shenzhen to have a large demand for night-time consumption and a high potential for night-time economy, making it one of the most active and prosperous megacities in China for night-time economic development. Exploring the sustainable development of the night-time tourism economy in Shenzhen, a modern, young, and cosmopolitan city, has a strong reference and value for mainland China and other similar cities. The popular tourist attractions in Shenzhen during the daytime are mainly Window of the World, Happy Valley, and Jinxiu Zhonghua Folk Culture Village. With the gradual saturation of daytime tourism projects, night-time tourism projects have become an extension and supplement of daytime tourism projects. Among them, Shenzhen night-themed light shows, light, and shadow shows, and light and water shows have a strong attraction to tourists (Figure 1).

### Shenzhen Tourism Economic Sustainable Development Integrated Assessment Design

#### Build the Evaluation Hierarchy Model

The hierarchical structure model in this study is built based on relevant theoretical studies such as the regional tourism system study and the hierarchical structure model constructed by the

two-wheel-drive potential model of tourism industry supply and demand. These two theoretical studies were chosen as the basis for two main reasons to systematically respond to the overall tourism economic development situation at the macro level and to highlight the importance of policy incentives and technical support. The theoretical study is more in line with the specific situation of Shenzhen. Therefore, according to the results of the above theoretical research and the six principles of index selection, the hierarchical structure model for the evaluation of tourism economic development in Shenzhen is constructed as shown in Figure 2.

The evaluation hierarchy model is divided into three parts: the target layer is a comprehensive evaluation of the sustainable development of the tourism economy of Shenzhen; the guideline layer includes four elements: market demand, regional supply, basic security, and social support, and under the four elements are several factors; the indicator layer is a set of 20 sustainable development indicators for the tourism economy in Shenzhen, and Figure 3 shows the evaluation model:

### Construction of Evaluation Index System

#### Selection and Description of Indicators

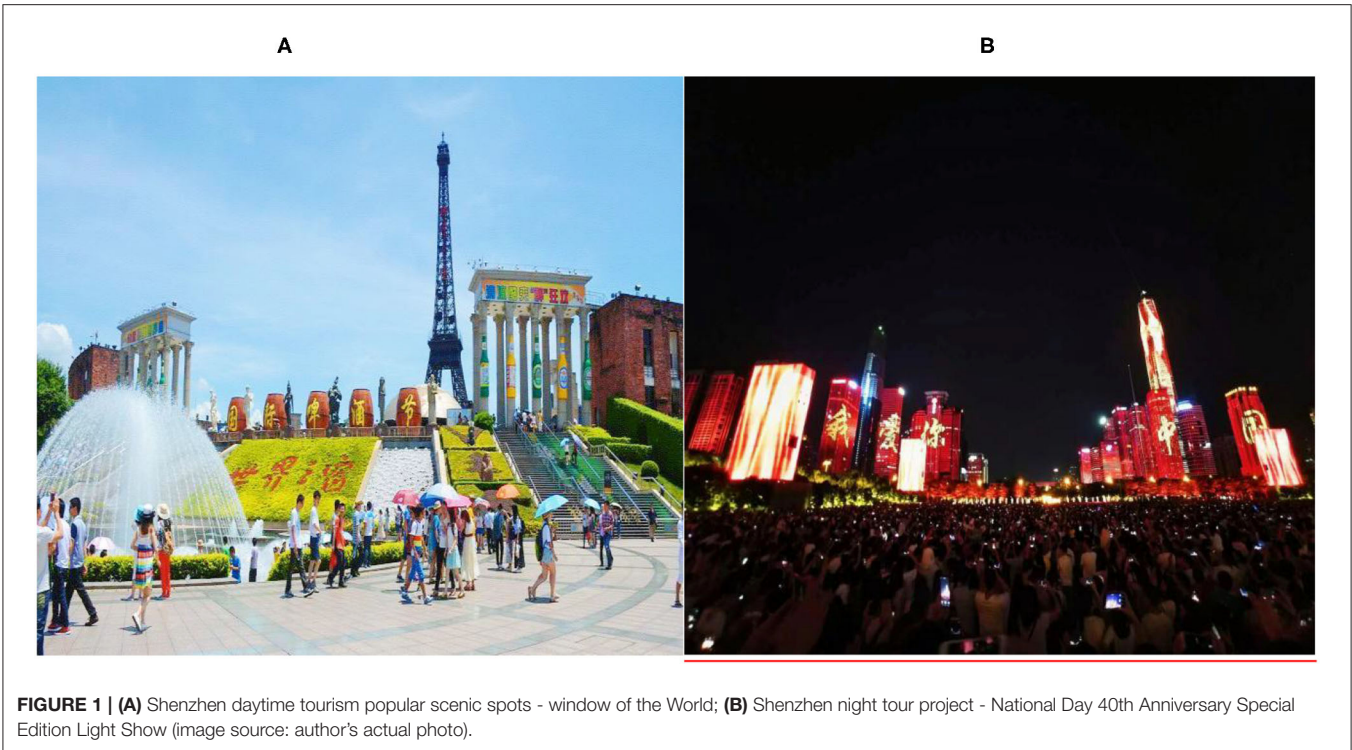
In this study, based on the economic data from the Shenzhen Statistical Bureau's Shenzhen Statistical Yearbook, Shenzhen Statistical Bulletin, Shenzhen Government Services Data Management Bureau, Shenzhen Culture, Radio, Television, Tourism, and Sports Bureau, and other official websites, combined with the tourism economic development of Shenzhen in the past 11 years (2011–2021), the preliminary evaluation index system of the tourism economic development in Shenzhen was established. The indicator system includes a target layer, a guideline layer, and an indicator layer. The criterion layer is divided into four dimensions, and the indicator layer is subdivided into 20 quantitative economic indicators. To ensure the scientificity and representativeness of the indicators, the authors consulted eight experts and scholars from the Shenzhen campus of Jinan University and further screened and sorted the initial 20 quantitative indicators through questionnaires.

#### Construction of Evaluation Index System

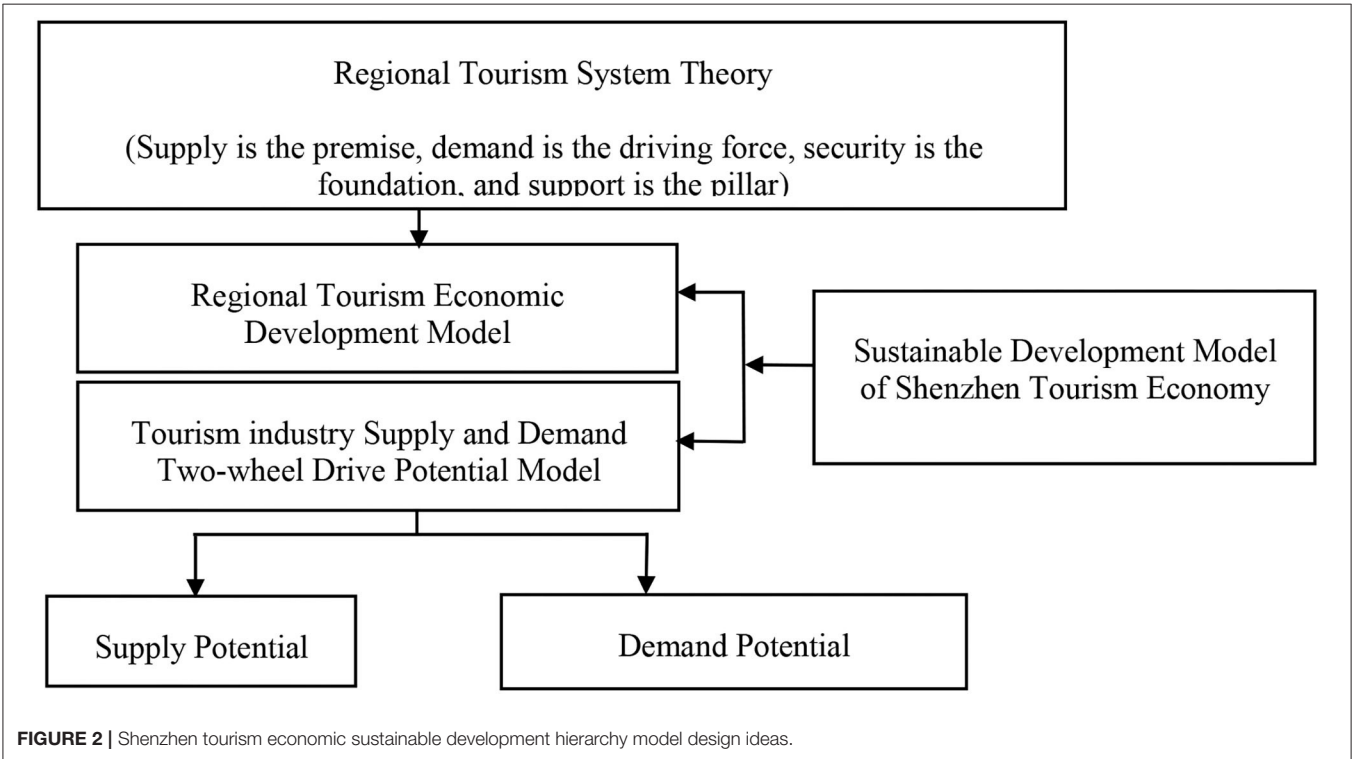
After determining the refined indicators, the indicators are summarized upwards to form three levels of indicators. Each level of evaluation indicators is expanded by the evaluation indicators of the previous level, and the indicators of the previous level can reflect their total evaluation through the evaluation of the indicators of the lower level (Table 1).

#### Hierarchical Analysis to Establish Index Weights

Through the expert consultation method, this study chose to issue indicator questionnaires to eight experts and scholars from the Shenzhen Institute of Tourism of Jinan University, and the scorers scored the relative importance scores of each indicator by comparing them on the basis of their rich theoretical knowledge and long practical experience. The 1–5 scale method was used to design this round of questionnaires, and the weights of each criterion item to the upper level were determined by comparing them with each other. The judgment matrix for comparing the



**FIGURE 1 |** (A) Shenzhen daytime tourism popular scenic spots - window of the World; (B) Shenzhen night tour project - National Day 40th Anniversary Special Edition Light Show (image source: author's actual photo).



**FIGURE 2 |** Shenzhen tourism economic sustainable development hierarchy model design ideas.

relative importance between the indicators of this level and the next level is constructed based on each criterion level and the judgment matrix for two comparisons. The calculation process of the evaluation index system was referred to relevant articles

by the author. An article titled Construction and Application Research of the Evaluation Index System of Green Economic Development in Sichuan Province explains the whole calculation process in detail. The article does not list all the operations, but

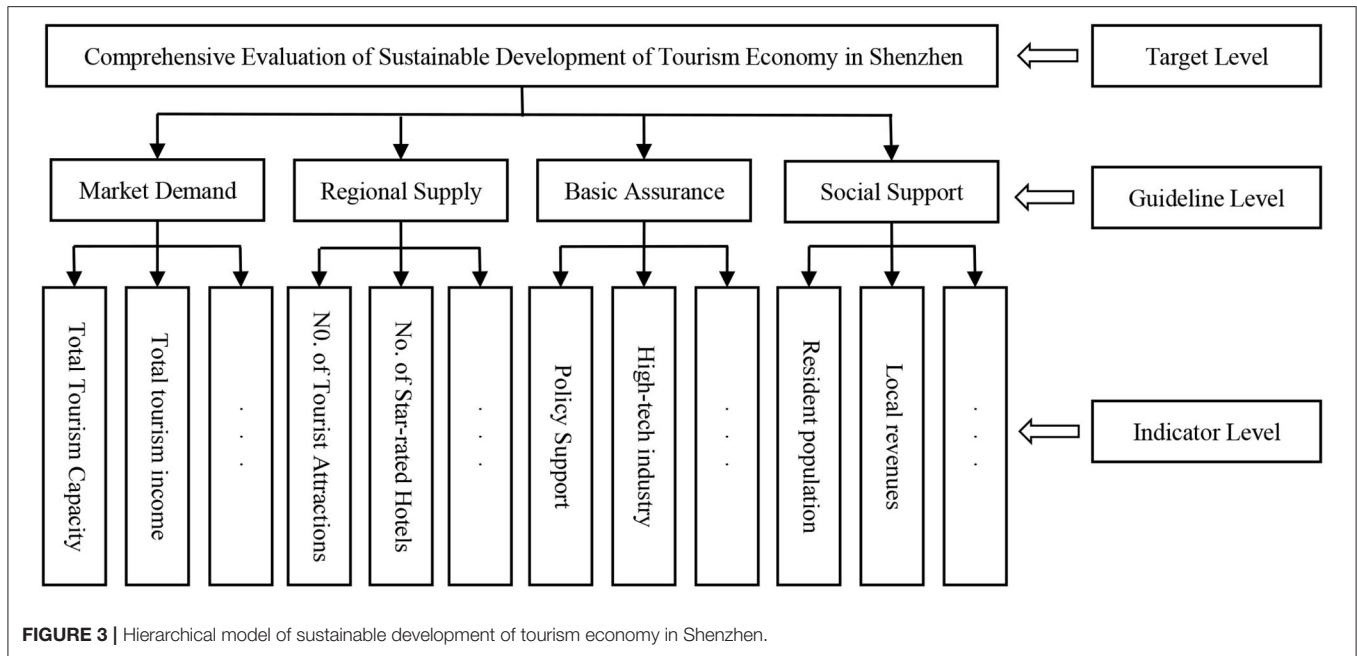


FIGURE 3 | Hierarchical model of sustainable development of tourism economy in Shenzhen.

only shows the representative steps and operators of each step (Hao, 2018). The specific calculation process for constructing the judgment matrix includes the following:

The first step is to determine the degree of influence of the four dimensions of market demand, regional supply, basic security, and social support on the target layer **A** and then construct a judgment matrix **A**:

$$A = \begin{pmatrix} 1 & 3 & 5 & 5 \\ 1/3 & 1 & 3 & 3 \\ 1/5 & 1/3 & 1 & 1 \\ 1/5 & 1/3 & 1 & 1 \end{pmatrix} \quad (1)$$

In the second step, determine the product of the elements of each row of matrix **A** to obtain the column vector **g**

$$g = \begin{pmatrix} 75.000 \\ 3.000 \\ 0.067 \\ 0.067 \end{pmatrix} \quad (2)$$

Raising the vector **g** to the 0.25th power yields the vector **h**:

$$h = \begin{pmatrix} 2.943 \\ 1.316 \\ 0.508 \\ 0.508 \end{pmatrix} \quad (3)$$

Normalize the column vector **h** to obtain the weight vector **w**:

$$w = \left( \frac{h_i}{\sum_{i=1}^4 h_i} \right)_{4 \times 1} = \begin{pmatrix} 0.558 \\ 0.249 \\ 0.096 \\ 0.096 \end{pmatrix} \quad (4)$$

In the third step, the maximum characteristic root  $\lambda_{max}$  is calculated as

$$Aw = \begin{pmatrix} 1 & 3 & 5 & 5 \\ 1/3 & 1 & 3 & 3 \\ 1/5 & 1/3 & 1 & 1 \\ 1/5 & 1/3 & 1 & 1 \end{pmatrix} \begin{pmatrix} 0.558 \\ 0.249 \\ 0.096 \\ 0.096 \end{pmatrix} = \begin{pmatrix} 2.270 \\ 1.013 \\ 0.387 \\ 0.387 \end{pmatrix} \quad (5)$$

$$\lambda_{max} = \frac{1}{n} \sum_{i=1}^n \frac{(Aw)_i}{wi} = 4.043 \quad (6)$$

Calculate consistency metrics as

$$C.I. = \frac{\lambda_{max} - n}{n - 1} \quad (7)$$

Calculate consistency ratio as

$$C.R. = \frac{C.I.}{R.I.} = 0.016 \quad (8)$$

Considering that the consistency ratio  $CR. = 0.016 < 0.1$ , the matrix **A** is judged to have satisfied the consistency condition. Similarly, we construct matrices **B**<sub>1</sub>, **B**<sub>2</sub>, **B**<sub>3</sub>, **B**<sub>4</sub>, and calculate their respective consistency ratios,  $C.R. < 0.1$ , one by one ( $i = 1, 2, 3, 4$ ) (R.I., matrices **B**<sub>1</sub>, **B**<sub>2</sub>, **B**<sub>3</sub>, **B**<sub>4</sub>, and their respective **C.R.**).

### Establishing a Comprehensive Evaluation Model

Establishing the comprehensive evaluation model is the landing point for constructing the index system and calculating the weights, and it is also the key for later application to analyze the comprehensive evaluation of Shenzhen's tourism economic development, reflecting its development status and trend level.

**TABLE 1** | Shenzhen tourism economic development comprehensive evaluation index system.

Target level	Guideline level	Indicator level	
A Shenzhen tourism economic development evaluation index system	B1 market demand	C1 total tourism receipts	
		C2 total tourism revenue	
		C3 tourism revenue as a proportion of GDP	
		C4 passenger turnover	
		C5 average hotel, hotel, and resort room opening rate	
		B2 regional supply	C6 number of tourist attractions
			C7 number of star-rated hotels
			C8 total number of travel agencies
			C9 amount of tourism network information released
			C10 number of tourism festivals and events
	B3 basic assurance	C11 policy support	
		C12 gross value of high-tech industry	
		C13 special funds for tourism development	
		C14 number of tourism employees	
		C15 city greening coverage rate	
		C16 city's civilian car ownership	
	B4 social support	C17 resident population	
		C18 local fiscal revenue	
		C19 per capita disposable income of urban residents	
		C20 total number of tourism colleges and universities	

In this study, the linear weighting method of indices was selected for evaluation—setting the weight vector  $w = \{w_1, w_2, w_3, \dots, w_n\}$ . The standardized index values are  $A = \{\alpha_1, \alpha_2, \dots, \alpha_n\}$ , then, its comprehensive evaluation model is as follows:

$$z = \sum_{i=1}^n w_i \alpha_i \tag{9}$$

In the model,  $z$  is the evaluation index of the target layer, and  $w_i$  and  $\alpha_i$  are the synthetic weights and standardized indicator values of indicator  $C_i$ , respectively. In this paper, the following methods will be used to standardize the positive and negative indicators separately:

When the indicator is positive,

$$r_j = \frac{x_j - \min x_j}{\max x_j - \min x_j} \tag{10}$$

When the indicator is an inverse indicator,

$$r_j = \frac{\max x_j - x_j}{\max x_j - \min x_j} \tag{11}$$

After processing the original data and combining the weight coefficients of each index, the specific indices of each dimension from 2011 to 2021 were obtained after linear weighting aggregation based on the comprehensive evaluation model.

### Cluster Analysis Design of Night Tourism Economic Form in Shenzhen Data Sources and Pre-processing

In the process of field research, the research team selected two major media platforms, namely, VWOD.com and Ma Hive, based on the ranking system of Internet big data websites. Then, they searched for reviews and travelogues of daytime and night-time tourism economic activities in Shenzhen with the keywords, “Shenzhen daytime/night-time tourism economic activities.” All user reviews and travelogue data about daytime and night-time tourism economic activities in Shenzhen were collected with OCT software and a descent collector. The group collected a total of 4,623 reviews and travelogues about Shenzhen’s daytime and night-time tourism economic activities. After manually deleting some irrelevant, repetitive, and exaggerated content, we obtained 3,739 valid reviews, totaling more than 300,000 words. These data include 1,672 reviews of daytime tourism economic activities and 2,067 reviews of night-time tourism programs. To determine the “saturation” of the text data, this study first conducted the first-word frequency count on the collected text data of ~300,000 words, and then iteratively added about 20,000 words. Then, it separately conducted the word frequency count until no new high-frequency words appeared, and the order of high-frequency words was unchanged. Then, the collected text data were considered to be “saturated.” Meanwhile, considering the recognition problem of ROST Content Mining software for fonts, this study corrected the misspellings and erroneous statements in the text one by one and made a simplified and uniform treatment. The time span of all texts is from January 1, 2018, to November 31, 2021.

### Research Methodology

Based on the characteristics of online texts, this study uses a combination of three research methods: content analysis, co-word analysis, and word cloud analysis. The content analysis method is a scientific research method that transforms unsystematic and qualitative symbolic contents such as spoken language, written text, and pictures into systematic and quantitative data information. Using content analysis to analyze the texts of tourists’ reviews and travelogues, uncovering the potential, implicit information in the texts becomes possible and thus obtains a true and complete psychological perception of tourists’ economic activities in daytime and night-time tourism,



respectively. In this paper, we analyze the content of travelers' reviews and travelogues with the help of ROST Content Mining professional content mining software. The word cloud analysis method is the extraction of keywords, the construction of a network of commonly used words, the construction of a word cloud graph, the analysis of word frequencies, and the visualization of the material collected in the study (Zhang et al., 2020). The co-word analysis method is to count the number of common occurrences of data words and phrases, to cluster these words in a hierarchical way to reveal the affinities between them, and then to analyze the structural changes of the content and themes they represent. This paper uses the popular software Excel for the statistical analysis of the classification of daytime and night-time tourism economic activities in the course of the study. The process of drawing the word cloud weight map uses 2 space bars to connect all the keywords before de-weighting to make a string, adjusts the software to 47, and appropriately modifies other parameters to show up to 47 keywords in the word cloud map. In this paper, word cloud weight maps of daytime and night-time tourism economic activity types are produced for comparison with the help of ROST Content Mining professional content mining software.

### Research Process

ROST CM software is a content mining software developed by Prof. Shen Ling's team at Wuhan University, which can perform word separation, word frequency statistics, word cloud analysis, and sentiment analysis, among others on a large amount of web text information. First, this study uses the software to perform word separation and word frequency statistics on the Excel documents summarized in the web text to screen and obtain high-frequency feature words and frequency counts of daytime and night-time tourism economic activities to gain a preliminary understanding of tourists' experiences of daytime and night-time tourism economic activities in Shenzhen. Second, the high-frequency characteristic words of daytime and night-time tourism economic activities are used to classify and statistically analyze their types of tourism economic activities and typical economic activities. Finally, it is further clustered into systematic tourism economic patterns, and word cloud weighting maps are produced for comparative analysis of daytime and night-time tourism economic patterns. In the entire process of data processing, the principle of retaining the original evaluation of tourists is used to organize the 3,739 collected user reviews and travelogues in an Excel file and to delete expressions, special symbols, and modify misspellings before converting them into TXT text format to ensure the consistency of the text and facilitate the extraction of feature words. The text information was imported into ROST Content Mining software for high-frequency word counting. By extracting high-frequency words, behavioral characteristic words, and filtering nonsense words, the top 60 high-frequency words (Table 2) related to the research topic were selected as the bases for analysis among all comment entries according to the vocabulary frequency from highest to lowest, respectively.

## FINDINGS

### Shenzhen Tourism Economic Sustainable Development Comprehensive Assessment Evaluation Index System Indicator Weights

According to the calculation results, Table 3 summarizes the weights of each indicator of the sustainable development evaluation index system of Shenzhen tourism economy, and the synthetic weights are the weights of 20 indicators ( $C_i$ ,  $i = 1, 2, 3, \dots, 20$ ) to the target A. The top five indicators with synthetic weights are C1 (total tourism reception), C2 (total tourism revenue), C6 (number of tourist attractions), C3 (proportion of tertiary industry to GDP), and C10 (number of tourism festivals and events).

### Tourism Economy Composite Index

The vertical trend and horizontal percentage analysis of the composite index aim to grasp the overall trend of tourism economic development in Shenzhen and the economic conditions available for the development of night tourism in Shenzhen. Table 4 shows the composite index of the tourism economy in Shenzhen in each dimension from 2011 to 2021.

#### *Trends in the Vertical and Horizontal Percentages of Each Dimensional Index*

In terms of both vertical and horizontal trends, the market demand dimension dominates from 2011–2021, with a maximum of close to or even more than 60%, followed by the regional supply, social support, and basic security dimensions, respectively (Figure 4). The period 2011–2021 shows a linear growth in the market demand index; after slowing down year by year from 2015 to 2017, it grows rapidly again in 2020. In the last 11 years, Shenzhen's tourism economy also grew in the same direction in the regional supply dimension, while the basic security and social support dimensions grew at a low rate in general, with the basic security dimension growing more erratically and the social support dimension growing steadily. Ultimately, the calculation of the average annual growth indices of the four dimensions over the 11 years reveals that the trend of the market demand dimension is the most pronounced (0.0488), followed by the regional supply dimension (0.0220), then by the social support dimension (0.0087), and finally the basic security dimension (0.0058).

#### *Analysis of the Overall Development Trend*

Based on the comprehensive evaluation model, Figure 4 shows the overall status of the tourism economic development index in Shenzhen for all years from 2011 to 2021, with a slightly slower growth rate from 2011 to 2021 (0.0313–0.0936), followed by a consistent uniform growth pattern; the economic development from 2016 to 2019 saw a decrease in growth twice (0.4908–0.5465, 0.6738–0.7195), whereas the previous growth rate was rapidly restored the following year after each decrease. Thus, Shenzhen's tourism economic development from 2011 to 2021

**TABLE 2** | High-frequency characteristic terms of Shenzhen's night-time tourism economic form (top 60).

Serial no.	Vocabulary	Word frequency	Weights	Serial no.	Vocabulary	Word frequency	Weights	Serial no.	Vocabulary	Word frequency	Weights
1	Night	1,378	0.085	21	All-in-one	222	0.014	41	Small town	114	0.007
2	Shenzhen	1,264	0.078	22	Museum	218	0.013	42	Love	109	0.007
3	Night economy	893	0.055	23	Lotus hill	211	0.013	43	Technology	107	0.007
4	Immersion	764	0.047	24	Bar	206	0.013	44	Modern	106	0.007
5	Experience	755	0.047	25	Night market	204	0.013	45	Wisdom	104	0.006
6	Lights	654	0.040	26	Characteristic	184	0.011	46	OCT	103	0.006
7	Park	653	0.040	27	Commercial street	175	0.011	47	Green	101	0.006
8	Night scenery	607	0.038	28	Starry night	172	0.011	48	Happy valley	92	0.006
9	Main guest	542	0.033	29	Traditional	158	0.010	49	Nightclub	91	0.006
10	Joy	521	0.032	30	Architecture	153	0.009	50	E-gaming	84	0.005
11	Coastal	502	0.031	31	Business	149	0.009	51	Fashion	78	0.005
12	Shopping	481	0.030	32	Music festival	148	0.009	52	Culture and sports	74	0.005
13	Light show	375	0.023	33	Bookstore	148	0.009	53	Water show	67	0.004
14	Performing arts	346	0.021	34	Starbucks	140	0.009	54	Night stay	59	0.004
15	Light show	346	0.021	35	Tea shop	131	0.008	55	Animation festival	57	0.004
16	Ecological	294	0.018	36	Halloween	124	0.008	56	Mission hills	54	0.003
17	Integrated	275	0.017	37	Shenzhen bay	120	0.007	57	Beer festival	53	0.003
18	Share	241	0.015	38	Cultural tourism	120	0.007	58	Races	49	0.003
19	Lantern festival	240	0.015	39	Mangrove	119	0.007	59	Citizen	47	0.003
20	Theme park	240	0.015	40	Gankeng	117	0.007	60	Center	42	0.003

<sup>a</sup>Both daytime and night-time high-frequency feature word frequencies and weights are obtained from later analysis, and only the night-time high-frequency feature word statistics are shown here.

shows a stable and fast growing trend. From the trend graph of the composite index, since 2011, Shenzhen's tourism market has rebounded and various tourism economic indicators have shown a strong recovery growth. The 2021 tourism economic composite index reached 0.9695, an increase of 0.9382 compared with 2011. In addition, the tourism economic composite index in the past 2 years fluctuated at ~0.9, indicating that Shenzhen's tourism economic development gradually transitioned from the stage of high growth to the stage of high-quality development.

## Clustering Analysis of Night-Time Tourism Economic Patterns in Shenzhen

### Clustering Comparison of Daytime and Night-Time Tourism Economic Patterns in Shenzhen

#### *Shenzhen Daytime Tourism Economic Form Classification Statistics*

In this study, the high-frequency words (the top 60) of the daytime tourism economic forms in Shenzhen are combined with the word frequency statistics, and the most frequent words such as "daytime," "Shenzhen," "tourism," "economy," and other proper nouns are deleted. The top 60 high-frequency words are further divided into 18 types of daytime tourism economic activities and further clustered into four types of tourism economic forms, namely, sightseeing, cultural immersion, ecological leisure, and business meeting, according to the

travel motives of tourists (**Table 5**). Statistics found that among the first 60 high-frequency feature words of daytime tourism economic activities, 23 are sightseeing, 26 are cultural immersion, 34 are ecological leisure, and 11 are business meetings. The cultural immersion type includes six types of cultural tourism performance daytime, theme park daytime, cultural and creative experience, technology and cultural experience, cultural and tourism festivals, and cultural and sports events. The ecological leisure style includes a green ecological park, leisure resort, leisure shopping street, and leisure complex in four categories.

#### *Shenzhen Night Tourism Economic Form Classification Statistics*

In this study, by combining the word frequency statistics and word cloud analysis of the top 60 high-frequency characteristic words of the night tourism economy in Shenzhen, the most frequent words such as "night," "Shenzhen," "tourism," and "economy" were deleted, and the top 60 high-frequency words were further divided into 15 types of night tourism economic activities, which were further stratified and clustered into three types of tourism economic forms, namely, sightseeing, cultural immersion, and host and guest leisure, according to the travel motives of tourists (**Table 6**). Statistics found that among the first 60 high-frequency feature words of daytime tourism economic activities, sightseeing accounted for 20, cultural immersion accounted for 40, and host and guest leisure accounted for

**TABLE 3** | Summary of the weights of indicators at all levels of sustainable development evaluation of the tourism economy in Shenzhen.

Primary indicator	Primary weight	Secondary indicator	Secondary weight	Synthetic weight	Synthetic weighting sort
B1 market demand	0.558	C1 total tourism receipts	0.371	0.207	1
		C2 total tourism revenue	0.347	0.194	2
		C3 share of tertiary industry in GDP	0.141	0.079	4
		C4 passenger turnover	0.088	0.049	8
		C5 average hotel, hotel, and resort room opening rate	0.053	0.030	10
B2 regional supply	0.249	C6 number of tourist attractions	0.366	0.091	3
		C7 number of star-rated hotels	0.223	0.056	6
		C8 total number of travel agencies	0.068	0.017	15
		C9 amount of tourism network information released	0.103	0.026	11
		C10 number of tourism festivals and events	0.241	0.060	5
B3 basic assurance	0.096	C11 policy support	0.469	0.045	9
		C12 total value of high-tech industry	0.083	0.008	17
		C13 growth rate of fixed assets investment in culture and tourism industry	0.194	0.019	14
		C14 number of tourism employees	0.151	0.014	16
		C15 city greening coverage rate	0.051	0.005	19
B4 social support	0.096	C16 city's civilian car ownership	0.051	0.005	19
		C17 resident population	0.207	0.020	12
		C18 local fiscal revenue	0.207	0.020	12
		C19 per capita disposable income of urban residents	0.523	0.050	7
		C20 total number of general secondary and higher education institutions	0.062	0.006	18

**TABLE 4** | Weighted standardized indices for each dimension of Shenzhen's tourism economy, 2011–2021.

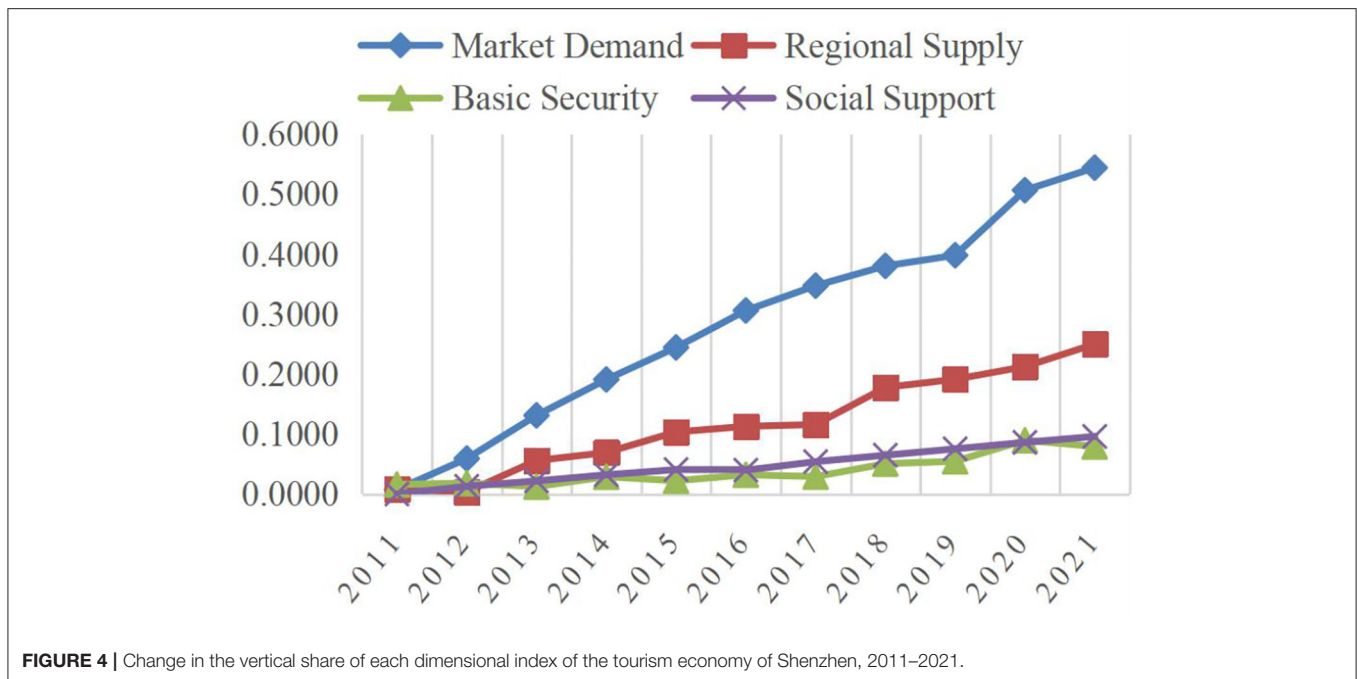
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Market demand	0.0074	0.0592	0.1312	0.1910	0.2444	0.3061	0.3474	0.3805	0.3982	0.5066	0.5442
Regional supply	0.0080	0.0036	0.0559	0.0692	0.1036	0.1128	0.1160	0.1778	0.1914	0.2126	0.2500
Basic security	0.0159	0.0181	0.0124	0.0289	0.0221	0.0322	0.0290	0.0507	0.0546	0.0896	0.0794
Social support	0.0000	0.0128	0.0218	0.0321	0.0408	0.0398	0.0540	0.0648	0.0754	0.0861	0.0960
Tourism economic index	0.0313	0.0936	0.2213	0.3212	0.4109	0.4908	0.5465	0.6738	0.7195	0.8950	0.9695

31. Among them, cultural immersion includes light shows, theme parks at night, night entertainment immersion, night cultural tourism performance, special night stay experience, night cultural tourism festivals, and night cultural and sports events in six categories. The main guest leisure style includes bars, cafes, teahouses, leisure and vacation, cultural leisure, leisure shopping streets, and leisure complexes in five categories (Figures 4, 5).

### Word Cloud Comparison of Daytime and Night-Time Tourism Economic Patterns in Shenzhen

According to the word cloud map drawn by ROST Content Mining software, although Shenzhen has the same two types of tourism economy patterns during daytime and night-time, significant differences exist in the types of tourism economic

activities and the focus of high-frequency words. Daytime excursions and tours are focused on scenic tours, intelligent tours, and coastal tours in Shenzhen, with famous scenic spots such as Window of the World, Jinxu Zhonghua, Da/Xiaomesha, and Eastern Overseas Chinese Town as hot spots for tourism economic activities. Night-time excursions and tours are not only focused on famous scenic spots. Instead, city night sightseeing places such as Lotus Hill, Civic Center, and Intercloud Sightseeing Layer have become night-time hitting places for tourists as well. Both day and night in the form of cultural immersion economy focus on the tourism economic development of traditional cultural and tourism festivals (National Day and New Year's Day), cultural and tourism performances, technological and cultural experiences (VR&AR immersive games, Xiaomi & Huawei experience stores,



smart hotels), and cultural and sports events in Happy Valley and Window of the World scenic spots. Unlike the daytime events, Shenzhen's night-time cultural immersion style focuses on technology light shows, light and water shows, light shows, and other night-time tourism products to light up the night-time economy. The daytime ecological leisure style focuses on the development of ecological tourism, with ecological gardens (flowers, plants, and animals, idyllic hills, and wetland parks) and art gardens (creative and cultural parks) becoming hot spots for tourism economic activities. The night-time tourism economy is cultural and leisure-oriented, with tourists concentrated in leisure shopping streets (Style Street, Baden Street), bookstores ("24-hour" bookstores, Sisyphus, Xinhua), and night markets. Business meetings are the shape of the daytime tourism economy, with tourists attending government meetings, conventions, research, and other tourism economic activities for business travel (Figure 6).

## DISCUSSION

### Sustainable Development Assessment of Shenzhen Tourism Economy

By assessing the sustainable development of the tourism economy in Shenzhen, the researcher analyzed that the overall level of tourism economic development in Shenzhen showed a stable and rapid growth trend, and the top five tourism economic indicators in terms of weight coefficients were market demand dimension indicators (seen in Table 4). In the dimensions of regional supply, basic security, and social support, the weight coefficients of four indicators, namely, C6 (number of tourist attractions), C10 (number of tourism festivals and events), C11 (policy support), and C19 (per capita disposable income of urban residents), are also higher. From the analysis of the

trend of the vertical and horizontal percentage changes of the individual dimension indices, the market demand dimension occupies a larger proportion, followed by the regional supply dimension. Apparently, with the continuous development of the economy and society, the status of tourism in the national economy of Shenzhen has been rising, and the overall level of sustainable development of the tourism economy has maintained a stable and rapid growth trend. In all dimensions, tourism consumption structure and consumer demand gradually upgrade; 1 tour supply gradually realizes the quality of tourism scenic spots, hotels, travel agencies, tourism festivals, and events, and other products; basic security is committed to benchmark international first-class level and enhance the development of service industry level and competitiveness; social support is constantly training and introducing talents, increases policy support, and strives to make the people's sense of access to tourism more adequate, have a more sustainable sense of wellbeing, and more secure sense of security. In 2011, the Shenzhen government proposed to cultivate the tourism industry into a strategic pillar industry of the national economy and more satisfying service industry for the people. In 2016, tourism was fully integrated into the national strategic system and became a strategic pillar industry of the national economy. However, along with the continuous upgrading of tourism consumption structure and demand, the development of the urban tourism economy presents an imbalance between tourism supply and demand. Therefore, in 2018, tourism departments at all levels in Shenzhen implemented the "Thirteenth Five-Year Plan for the Development of Tourism in Shenzhen" and other relevant policy documents to promote the transformation and upgrading of the city's tourism economic structure and encourage enterprises to develop new tourism products. In 2018, Shenzhen's National Day night-time light show performance attracted a large number

**TABLE 5 |** Classification of high-frequency characteristic words of the economic form of daytime tourism in Shenzhen.

Tourism economic form	Types of tourism economic activities	High frequency feature words	
Excursions and tours (23)	Scenic area tour	Splendid China, Window of the World, Eastern Overseas Chinese Town	
	Smart tour	Taojinshan Greenway, Eastern China Overseas Chinese Town	
	Coastal tourism	Dameisha, Xiaomeisha, Sea World, Dapeng	
	Cultural tourism town	roses, flowers, specialties, ganking	
	City day view light	Lotus Hill, Civic Center, Inter-Cloud Sightseeing, Window of Shenzhen and Hong Kong	
Cultural immersion (26)	Cultural tourism performing arts matinee	Folk Culture, Window on the World	
	Theme park matinee	Happy Valley, Cloud Dream Land, Eastern China Overseas Chinese Town Warrior Valley	
	Cultural and creative experience	Creative Culture Park, Art Museum, Museum, Oil Painting Village	
	Technology and culture experience	Smart Hotel, Indoor VR, AR Games, Xiaomi & HUAWEI Experience Store	
	Cultural and tourism festivals and events	Traditional Chinese cultural festivals (National Day, New Year's Day, Mid-Autumn Festival)	
	Cultural and recreational events	Regatta, marathon, soccer tournament, telethon	
	Ecological leisure (34)	Green eco Park park	Shenzhen Bay, Wetland, Lotus Hill
	Zoological and botanical gardens	Xianhu Botanical Garden, Safari Park	
	Flower garden	Expo Park	
	Garden hills	Mission Hills, Luzui Mountain Resort	
	Art garden	Ecological Art	
	Leisure vacation	Eastern Overseas Chinese Town, Hot Springs, Nature Reserves	
	Leisure shopping street	Chung Ying Street, Dongmen Old Street, cafes, bookstores, teahouses	
	Leisure complex	Culture and leisure	Joyful coast, cultural life, the
		Leisure shopping	Shopping Park, Convention Center, Coastal City, Wanxiangtiandi
Business meeting (11)	Casual dining	Hong Kong style, creativity, style	
	Political meetings	Shenzhen Silver Lake Conference Center Hotel	
	MICE events	Convention and Exhibition Center (Cultural Fair, High Tech Fair, Tasting)	
	Research activities	Shenzhen Science Museum, Party History Museum	

**TABLE 6 |** Classification of high-frequency characteristic words of night tourism economic form in Shenzhen.

Forms of tourism economy	Types of tourism economic activities	High frequency feature words	
Excursions and tours (20)	Scenic area tour	Splendid China, Window of the World, Eastern Overseas Chinese Town	
	Marina night tour	Dameisha, Xiaomeisha, Sea World, Dapeng	
	City night sightseeing	Intercloud Sightseeing, Civic Center, Window of Shenzhen and Hong Kong, Lotus Hill	
	Cultural tourism town	Featured, Gan Hang	
	Cultural immersion (40)	Light show	Technology light show
		Light and water show	Musical Fountain, Happy Harbor
		Light and shadow show	Air Drones, Star Magic, Love, Mission Hills, Eco Art
	Theme park night show		Happy Valley, Eastern China Overseas Chinese Town Warrior Valley, Window of the World
	Night-time entertainment immersion		Beachfront BBQ, VR&AR immersion games,
	Night-time cultural and performing arts		Happy Mash, Grand Theater, Jinxiuhua Folk Culture Village
	Featured night stay experience		Star Tent, Night Stay Museum
	Night-time cultural and tourism festivals		Halloween, international magic, light show, music, animation, beer
	Night-time cultural and sports events		Sports Park, Fancy Extreme Motorcycle, World Championship, Open Sports Dance, eSports, ICC International Champions Cup, NBA
Host and guest leisure (31)	Bars, cafes, teahouses		BAR, microbrew, coffee tribe, Starbucks, tea house, tea garden, tea room
	Leisure shopping street		Baden Street, Toyosu-cho Pedestrian Street, Xili 366 Street, Chung Ying Street, Style Street, Dongmen Old Street, Shijing Night Market
	Culture and leisure		24 Hours Bookstore, Sisyphus, Xinhua
	Leisure complex	Culture and leisure	Joyful Coast, 1979 Cultural Life, the
		Leisure shopping	Shopping Park, Convention Center, Coastal City, Wanxiangtiandi
		Casual dining	Hong Kong style, creativity, music, cruise ship

of visitors, prompting the emergence and spurt of Shenzhen's night-time tourism economy. According to the "Shenzhen Night Economy Consumption Report," all of Shenzhen's night-time economy indicators ranked among the top in the country in 2021. Shenzhen's high work intensity, fast-paced life, a high proportion of young people, and long duration of summer compel Shenzhen to have a large demand for night-time consumption and a high potential for a night-time economy. Therefore, at the present stage, the development of night-time economy with diversified business modes and rich experiences in Shenzhen is a move that responds to people's pursuit of spiritual culture, an inherent choice to adapt to the transformation of current social conflicts, and an inevitable way for the tourism economy to be developed.

### **Shenzhen Night Tourism Economic Form Classification Development**

The three-night tour economy models synergize and influence each other, prompting the night tour economy to pull the cultural tourism industry to gather. The immersion experience night tour economy mode is centered on technology immersion experience; the host-guest sharing night tour economy mode is aimed at host-guest interaction and creating diversified night tour IP; the integrated night tour economy mode is based on the integration of culture, business, and tourism industries. Shenzhen night tour projects include night scenery, night performance, night banquet, night shopping, night entertainment, and night accommodation.

### **Shenzhen Immersion Experience Night Tour Economic Model**

Shenzhen immersion experience night tour projects are indoor and outdoor projects. Most of the indoor projects take technology as the grip to make visitors achieve the immersion effect, while the outdoor projects focus on the "Technology + Culture + Art" mode to make visitors achieve the experience effect. Shenzhen immersive experience light show is going through a gradual process from lighting to beautification, scene, and content, that is, from technology to Technology + Art, and then to Technology + Art + Culture. The drone light show launched in 2020 injects new momentum into cultural tourism technology through intelligent control technology and performance services. It also injects new vitality into Shenzhen's night tour economy. Theme parks at night are the fields with the widest application of technology, the fastest product updates, and the greatest pace of innovation in the cultural tourism industry. They are also the test areas for experience research and experience innovation. Theme park night immersion experience projects not only increase the sensory experience but also increase the cultural experience and spiritual resonance; the cultural tourism characteristics of the town are the most intensive night tour products, the most Hakka cultural characteristics of the location, night tour reinvented the cultural tourism town tourism market in Shenzhen; Shenzhen night stay in the night stay museum and the starlight tent night stay Netflix project, and such experiential projects to storytelling accommodation content have the ultimate goal to meet the parent-child experience crowd. Shenzhen's immersive experience night tour economic model is led by technology, with art running through it and culture as

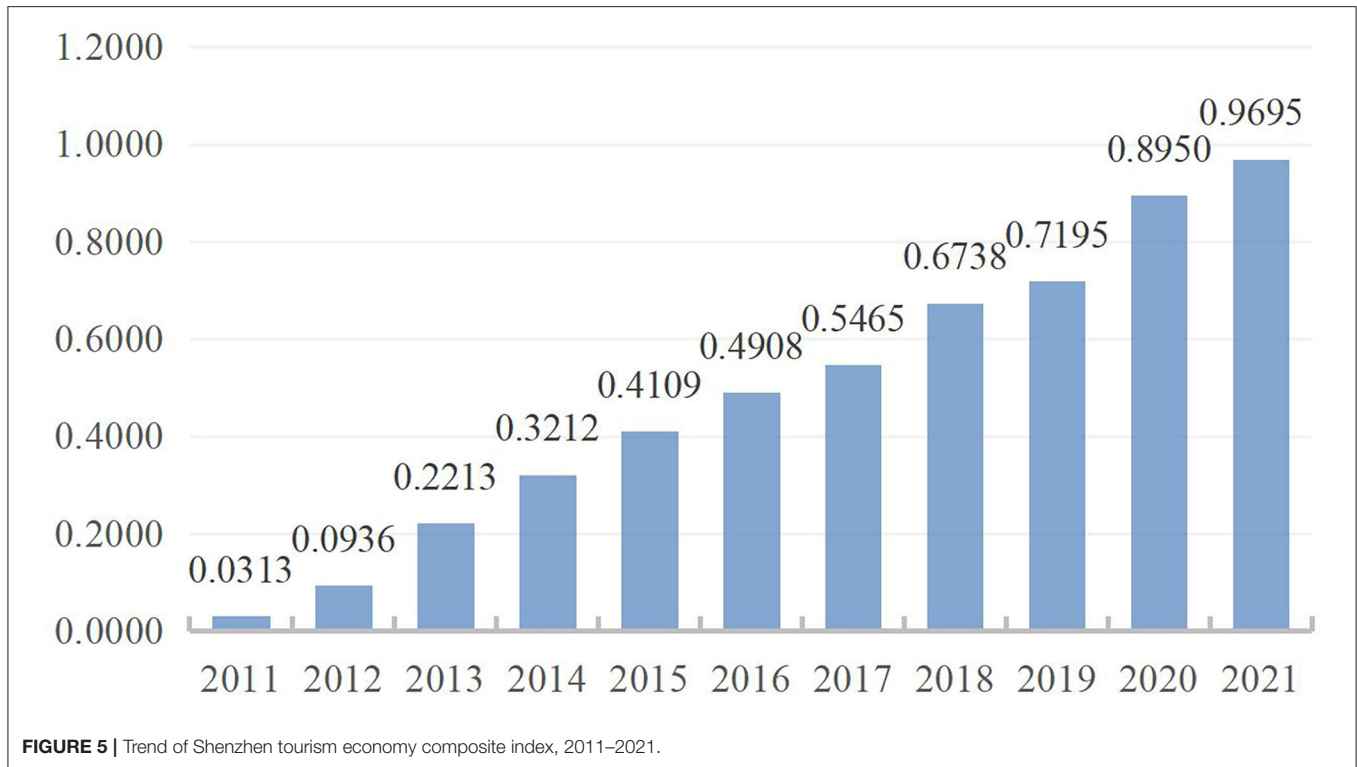
the landing point, activating cultural consumption and forming a cultural tourism industry cluster.

### **Shenzhen Host-Guest Shared Night Tour Economic Model**

The Shenzhen main guest sharing night tour economy model focuses on the traditional night tour economy form, with the help of some modern night tour economy elements for innovative development. Among the diversified night tour demands, local life and cultural experiences become an important part, and tourists choose activities such as leisure and sightseeing in public open spaces of the city, night cultural festivals and events, and cultural performances significantly more than options such as food, shopping, and movie theaters. Shenzhen's city night scenery and cruise ship night tourism have become an important engine for the development of Shenzhen's night tourism economy. On the inter-cloud sightseeing level of Shenzhen Ping An Financial Center Building, visitors can enjoy a 360° view of the city night scenery; to the east, the Diwang Building and Jingji 100 reflect the beautiful scenery of Luohu; to the west, the shopping park, Shenzhen Golf, Shenzhen Bay, Overseas Chinese Town, and the Qianhai Shekou Free Trade Zone, among others, form a vast urban fading picture; to the west, the shopping park, Shenzhen Golf, Shenzhen Bay, Overseas Chinese Town, and the Qianhai Shekou Free Trade Zone, among others, form a vast urban fading picture; South facing, with the Futian Port and Hong Kong North in full view. The night show is the core element of this model development, and the night scene is the soul of the night show. Through activities such as lantern fairs and cultural festivals held in the Fairview scenic area, the night show box office is promoted to retain visitors overnight and showcase local cultural roots. From this experience, Shenzhen's host-customer sharing night tour economic model apparently links night scenery, night performance, night shopping, and night entertainment into a whole multi-industry economic chain, embellishing the traditional night tour economic form with technology and other elements and promoting the development of Shenzhen's cultural tourism emerging consumer industry cluster.

### **Shenzhen's an Integrated All-In-One Night Tour Economic Model**

Shenzhen's comprehensive integrated night tour economy model currently takes the cultural, commercial, and tourism complex; leisure shopping complex; and leisure catering complex as the main forms, which is an important model for the sustainable development of Shenzhen's night tour economy. It is located at the core of the Shenzhen Bay business circle, with marine culture as the theme, ecological and environmental protection as the concept, innovative business as the main body, creating urban coastal health life as the dream, pioneering the theme of business and coastal tourism, leisure and entertainment and cultural creativity as one. It integrates retail, catering, entertainment, office, apartment, hotel, and wetland park, to name a few, forming a unique business + entertainment + culture + tourism + ecological new business model; truly realizing the value combination of theme business, fashion entertainment, and healthy life; and promoting the innovation and development of



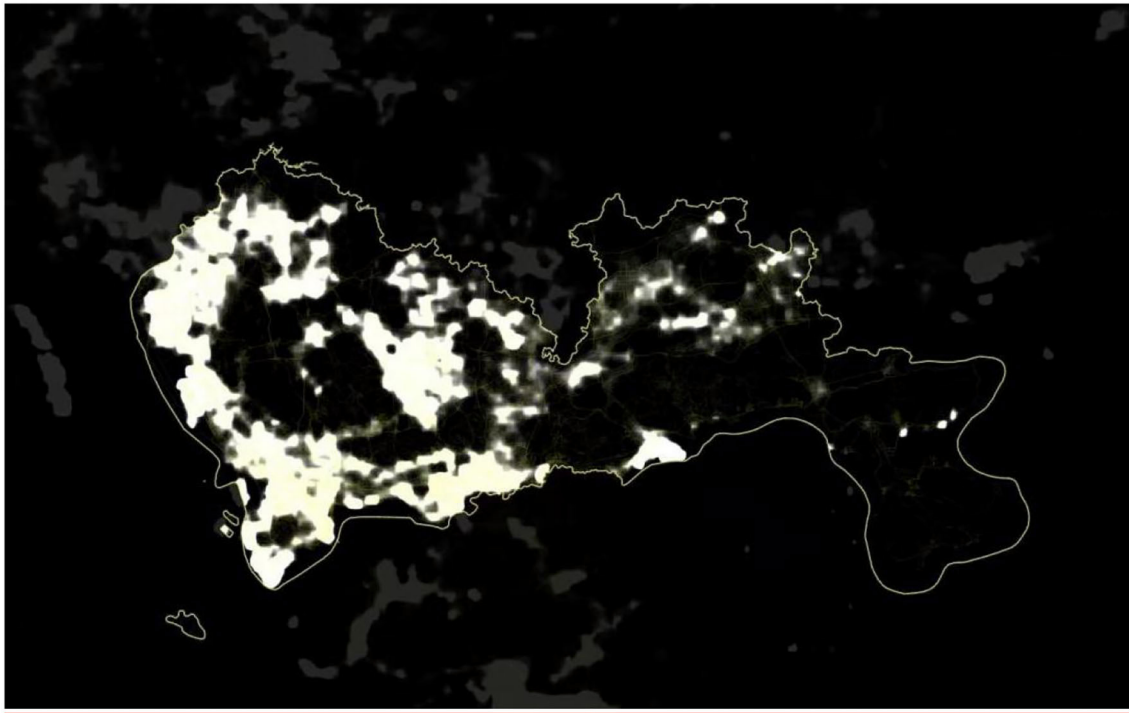
China’s theme business with practical action. Leisure shopping complexes are manifested in a rich variety of products and forms. The early sales model is replaced by 24-h convenience stores, supermarkets, and bookstores; large integrated entertainment immersion experience shopping malls, and other new forms. With Shenzhen’s escalating consumer demand, tourists like to leave early and return late, experience local shopping happiness, and their sense of access at night is stronger. Night leisure shopping complexes drive the sustainable development of the night economy. The night leisure dining complex is the initial stage, with cruise music dining bar as the main breakthrough point, reflecting the characteristics and advantages of the Shenzhen coastal city, prompting tourists to generate interest

in night travel, and shaping the image of Shenzhen coastal city at night. Therefore, Shenzhen’s comprehensive all-in-one night tour economic model takes the cultural, commercial, and tourism complex as the main body and the leisure shopping and catering complex as the abundance point, forming a cultural, commercial, and tourism industry integration cluster (Figure 7).

## CONCLUSION AND IMPLICATIONS

### Conclusion

Following the review of the current situation of night tourism research and existing night economic development models at home and abroad, this study focuses on a comprehensive



**FIGURE 7** | Shenzhen night light distribution map (image source: drawn by the author with GIS software).

assessment of the overall tourism economic development in Shenzhen concerning typical night tourism economic development cities at home and abroad. It then explores the night tourism economic patterns in Shenzhen and clusters them to propose corresponding realization strategies for the localized night tourism economic development in Shenzhen. The results of the study show that the development of Shenzhen's night tourism economy requires the joint efforts of the government, enterprises, and the public. The government works on the four aspects of ecology, sustainability, cross-border industrial integration, and policy; the enterprises work on the three aspects of cultural promotion, technology integration, and operation; and the society enhances the sense of happiness, access, and integration through night tour activities. Shenzhen should aim to create a "livable, workable, and tourable quality living circle" to achieve the following: visitors can continue to play night-time programs when they have not yet had enough fun during the day and residents can enhance interaction with visitors and thus create a state of life and tourism shared by hosts and visitors. From the government's point of view, the Shenzhen government should actively cater to the national policy guidelines to focus on the development of the night tour economy, increase the support for the night tour economy, and encourage businesses to develop night tour projects. From the enterprise level, we need to do a good job of developing and operating the night tourism market from three aspects: culture, technology, and operation. From the social point of view, with the improvement of residents' living standards, more and more people are focusing on the pursuit of material and spiritual aspects.

In both Eastern and Western civilizations, the original meaning of "economy" is closely linked to the management of human relationships. In the East, the origin of the "economy" is linked to the prosperity of a nation. But whichever way you read it, economics is richer and broader than money transactions; it involves culture and politics, and it also requires a deep understanding rooted in human nature and human nature. Night-time tourism economic activity is never isolated, it can be seen as a continuation of the daytime tourism economic life. The accelerated urbanization has broken the boundary between day and night, and people arrange more activities such as study, work, travel, leisure, entertainment, shopping, and socializing at night, so the consumption at night reflects the people's livelihood. The night has become the most playful of economic life because it carries the softest part of human nature (Kang, 2019). This is a map of the distribution of lights at night in Shenzhen, which shows that the lights are mainly distributed in the central and western regions of the city. A dense population means a vibrant economy, and a vibrant economy is reflected in the night as you look down from space. Shenzhen's daytime and night-time tourism economy caters to the city's culture and people's consumption needs, and reflects the level of development of the city's economy. The prosperity of the night tourism economy can further improve the development level of tourism, increase the proportion of tourism in the industry, is an important push to promote economic restructuring and accelerate the transformation of economic development mode. Black and white, day and night, are no longer borders, but colors. Human vision is no longer trapped by footsteps, and human



cognition is no longer trapped by sunrise and moonset, which is the real meaning of night economics.

## Implications

This study has the following two limitations and shortcomings: (1) Considering the existing few foreign studies related to the field of the night-time economy, we cannot find foreign cities with night tourism development that are more similar to Shenzhen. (2) The domestic research on the night tourism economy remains at the level of simple exposition. Thus, future research can be combined with economics and tourism to continue exploring the relationship between consumer participation behavior and happiness and other related research.

## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## ETHICS STATEMENT

Written informed consent was obtained from the individual(s) for the publication of any

## REFERENCES

- Bellis, M. A., Hughes, K., Bennett, A., and Thomson, R. (2003). The role of an international nightlife resort in the proliferation of recreational drugs. *Addiction* 98, 1713–1721. doi: 10.1111/j.1360-0443.2003.00554.x
- Bossemma, F., Retre, J., Pereira, S., and Russo, P. (2018). Your night out under the stars: reaching beyond native audiences. *CAPJ* 24, 40–49.
- Chen, Y., Chen, C. M., Liu, Z. Y., Hu, Z. G., and Wang, X. W. (2015). Methodological functions of CiteSpace knowledge graphs. *Scientol. Res.* 33, 242–253. doi: 10.16192/j.cnki.1003-2053.2015.02.009
- Cheng, J. L. (2018). Analysis of the evolution of regional tourism economic differences and dominant factors in China. *East China Econ. Manag.* 32, 56–62.
- Cheng, Y. W. (2019). *Classified Policy to Promote Museum Night Tour*. 11-01. p 003.
- Dai, B., and Yang, H. H. (2019). Night tourism leads the new trend of cultural tourism. *China Real Estate* 14, 73–75. CNKI:SUN:GFCD.0.2019-14-026
- Danilko, E. S. (2019). The night of museums in the museum of death: communication on the border between worlds. *Sib. Hist. Res.* 4, 88–113. doi: 10.17223/2312461X/26/5
- Di, Q. B., and Han, Z. L. (2009). Evolutionary characteristics of sustainable development of marine economy in Liaoning Province and its systematic coupling model. *Econ. Geogr.* 29, 799–805. CNKI:SUN:JJDL.0.2009-05-021
- Eldridge, A. (2019). Strangers in the night: nightlife studies and new urban tourism. *J. Pol. Res. Tour. Leisure Events* 11, 422–435. doi: 10.1080/19407963.2019.1583666
- Evans, G. (2012). Hold back the night: Nuit Blanche and all-night events in capital cities. *Curr. Issues Tour.* 15, 35–49. doi: 10.1080/13683500.2011.634893
- Fu, Y. X. (2016). Night economy strategy for night lighting planning in tourist cities - Anshun City as an example. *Constr. Technol.* 7, 114–115. doi: 10.16116/j.cnki.jskj.2016.07.004
- Fu, Y. X., and Gan, W. (2013). A review of selected topics for master's theses in urban night lighting. *J. Light. Eng.* 24, 13–19. doi: 10.3969/j.issn.1004-440X.2013.06.003
- Giordano, E., and Gwiazdzinski, L. (2018). The urban night, a new frontier for the Italian Geography. *Rivista Geografica Italiana* 125, 437–452.

potentially identifiable images or data included in this article.

## AUTHOR CONTRIBUTIONS

MZ: conceptualization and funding acquisition. RZ, SC, and SX: investigation. RZ and SC: methodology. RZ: writing-original draft. RZ, SC, RL, and MZ: writing-review and editing. All authors have read and agreed to the published version of the manuscript.

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- Gruner, M., and Ansoorge, U. (2017). Mobile eye tracking during real-world night driving: a selective review of findings and recommendations for future research. *J. Eye Mov. Res.* 10:18. doi: 10.16910/jemr.10.2.1
- Gui, H. Z. (2019). The economics of night. *Explor. Decision Making* 10:53. CNKI:SUN:JCTS.0.2019-10-031
- Hao, J. (2018). The construction and application of green economic development index system in Sichuan Province. *CNKI* 2018:169594. CNKI:CDMD:2.1018.169594
- Henderson, J. (2017). Global cities, Tokyo, urban tourism. *Int. J. Tour. Cit.* 3, 143–157. doi: 10.1108/IJTC-01-2017-0006
- Hsieh, A. T., and Chang, J. (2006). Shopping and tourist night markets in Taiwan. *Tour. Manag.* 27, 138–145. doi: 10.1016/j.tourman.2004.06.017
- Huang, W. J., and Wang, P. (2018). “All that's best of dark and bright”: day and night perceptions of Hong Kong cityscape. *Tour. Manag.* 66, 274–286. doi: 10.1016/j.tourman.2017.12.006
- Huang, Y., and Liao, Y. J. (2017). Practices, problems and reflections on the night opening of domestic museums. *Southeast Culture* 1, 121–126. CNKI:SUN:DNWH.0.2017-01-020
- Joshi, S., Sharma, M., and Kler, R. (2020). Modeling circular economy dimensions in agri-tourism clusters: sustainable performance and future research directions. *Int. J. Math. Eng. Manag. Sci.* 5, 1046–1061. doi: 10.33889/IJMEMS.2020.5.6.080
- Kang, M. (2019). Study on the development of night tour products in Shijiazhuang City. *J. Shijiazhuang College* 21, 15–20.
- Kumar, M., and Upadhyaya, A. (2017). Night shopping a tourist attraction: a study of night shopping in Dubai. *J. Tour. Serv.* 8, 7–18.
- Lee, S., Park, H., and Ahn, Y. (2020). The influence of tourists' experience of quality of street foods on destination's image, life satisfaction, and word of mouth: the moderating impact of food neophobia. *Int. J. Environ. Res. Public Health* 17:20. doi: 10.3390/ijerph17010163
- Li, B. H., Luo, Q., Liu, P. L., and Zhang, J. Q. (2017). Citespace-based knowledge mapping analysis of Chinese traditional village research. *Econ. Geogr.* 37:9. doi: 10.15957/j.cnki.jjdl.2017.09.026
- Li, X. (2014). *Research on the Innovative Development of Night Tourism in China*. (Master), Fudan University, Shanghai, China.

- Li, X. Y. (2013). *Research on the Evaluation of Tourism Economic Development Potential in Mountainous Counties of Luoyang*. (Master), Zhengzhou University, Zhengzhou, China.
- Li, Y. K., and Wang, C. Y. (2014). Economic analysis of urban night markets based on principal component-entropy weight method - a case study of Chongqing city. *Urban Issues* 3, 96–101. CNKI:SUN:CSWT.0.2014-03-017
- Liao, Y. Y. (2020). *Study on Optimization of Sanya Night Tourism Products Based on Tourist Satisfaction*. (Master), Hainan Institute of Tropical Oceanography, Sanya, China.
- Liu, C. (2017). *A Study on the Localization of Bar Culture in Changsha*. (Master), Hunan University, Changsha, China.
- Liu, Y. H. (2019). *Economic Development of Night Tourism Under the Integration of Cultural Tourism* (Master). Lanzhou: North West Normal University.
- Lopez, A. L., Ramirez, G. C., and Venegas, G. J. Q. (2018). The touristic performance of the Night Walking Tour: a representation of undocumented Mexican migration to the United States. *Teor. Prax.* 14, 151–173. doi: 10.4324/9781351320603-7
- Mao, Z. G., Long, Y. N., and Ye, X. (2020). Advances in night-time economic theory. *Dyn. Econ.* 2, 103–116. CNKI:SUN:JJXD.0.2020-02-010
- Muresan, I. C., Oroian, C. F., Harun, R., Arion, F. H., Porutiu, A., Chiciudean, G. O., et al. (2016). Local residents' attitude toward sustainable rural tourism development. *Sustainability* 8:100. doi: 10.3390/su8010100
- Pinke-Sziva, I., Smith, M., Olt, G., and Berezvai, Z. (2019). Overtourism and the night-time economy: a case study of Budapest. *Int. J. Tour. Cities* 5, 1–16. doi: 10.1108/IJTC-04-2018-0028
- Scafetta, N., and Mazzarella, A. (2018). Cultural noise and the night-day asymmetry of the seismic activity recorded at the Bunker-East (BKE) Vesuvian Station. *J. Volcanol. Geotherm. Res.* 349, 117–127. doi: 10.1016/j.jvolgeores.2017.10.010
- Silver, D. A., and Hickey, G. M. (2001). Managing light pollution through dark sky areas: learning from the world's first dark sky preserve. *J. Environ. Plan. Manag.* 63, 2627–2645. doi: 10.1080/09640568.2020.1742675
- Song, H., Kim, M., and Park, C. (2020). Temporal distribution as a solution for over-tourism in night tourism: the case of Suwon Hwaseong in South Korea. *Sustainability* 12:14. doi: 10.3390/su12062182
- Song, M. X., Wei, C. Y., and Wang, W. (2011). Opportunities and challenges in the sustainable development of historical towns in Hunan Province: a case study of cultural tourism development in the towns of Changsha. *Econ. Geogr.* 31, 79–83. CNKI:SUN:JJDL.0.2011-01-014
- Tang, Y. Y. (2009). Exploring folklore-based tourism festivals: an example of intangible cultural heritage in Quanjiao County, Anhui Province. *Resour. Dev. Market* 25, 381–384. CNKI:SUN:ZTKB.0.2009-04-029
- Tony, R. (2003). Space station light show sparks aurora riddle. *Nature* 425:6961. doi: 10.1038/425888a
- Tu, C. C., and Liou, D. Y. (2009). "Japanese tourists perceptions of shopping at Taiwan Night Markets," in *IEEE International Conference on Industrial Engineering & Engineering Management*. Piscataway, NJ: IEEE.
- Wang, H., and Yao, D. N. (2018). Study on the innovative development of "night economy" in the context of quality tourism: the case of Lushunkou District, Dalian. *J. Anshan Normal College* 20, 13–18.
- Wesemann, A. (2005). Fire dancing for non-smokers. And other insights into this year's summer festival. *Ballettanz* 5, 28–35.
- Won, J., Lee, J. Y., and Jun, J. W. (2020). Influences of SNS (Social Network Service) uses and musical consumption on city branding: a focus on Broadway, New York and the West End, London. *Sustainability* 12:3856. doi: 10.3390/su12093856
- Xiao, Y., Zhao, J., Sun, S., Guo, L., Axmacher, J., and Sang, W. (2020). Sustainability dynamics of traditional villages: a case study in Qiannan Prefecture, Guizhou, China. *Sustainability* 12:341. doi: 10.3390/su12010314
- Xiong, Y., and Wen, Q. L. (2019). Performing arts technology in night tourism. *Perform. Arts Technol.* 8, 8–12. CNKI:SUN:YYSH.0.2019-08-004
- Xu, J. K. (2014). *Research on the Development of Night-Time Tourism in Wuhan City Based on the Analysis of Tourism Product Structure*. (Master), Huazhong Normal University, Wuhan, China.
- Xu, Y. N. (2019). "Let traditional culture 'come alive' the Forbidden City opens its first night show to welcome the 'Night of the First Yuan,'" in *China Convention and Exhibition (China Conference)* (Beijing), 18.
- Yu, K. S. (2018). *Research on the Production of Urban Water Night Tourism Space*. D. Guangzhou: South China University of Technology.
- Yue, C., and Jing, Y. D. (2013). A review of night tourism research in China. *Tour. For.* 6, 71–76. doi: 10.3969/j.issn.1674-3784.2013.04.013
- Zeng, G., Shang, Y., Min, Y., and Si, Y. (2015). Convergent evolution of regional economic development patterns in China - an example of 16 typical patterns in China. *Geogr. Res.* 34, 2005–2020. doi: 10.11821/dlyj201511001
- Zhang, K., Zhang, M., Law, R., Chen, X. Y., and Wang, Q. Y. (2020). Impact model of tourism production and consumption in Nanjing Yunjin: the perspective of cultural heritage reproduction. *Sustainability* 12:83430. doi: 10.3390/su12083430
- Zhong, G. (2019). *What Did Shenzhen Light Show "Show" Out of? Shenzhen: Special Economic Zone*. doi: 10.1016/S0262-1762(19)30027-6
- Zmyslony, P., and Pawlusinski, R. (2020). Tourism and the night-time economy: the perspective article. *Tour. Rev.* 75, 194–197. doi: 10.1108/TR-05-2019-0158

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