

Article

Comprehensive Evaluation of the Provincial Sustainable Tourismization Level in China and Its Temporal and Spatial Differences

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Abstract: Sustainable tourismization is a favorable development mode and pathway for the promotion of the coordinated development of the economy, society, and ecology. Based on the connotations of tourismization, a comprehensive evaluation index system of sustainable tourismization was constructed. This system consists of three dimensions: consumption tourismization, spatial tourismization, and industrial tourismization. The level, spatial, and temporal distribution characteristics, and differences in sustainable tourismization among China's provinces from 2009 to 2018 were measured and analyzed using the improved entropy method, the Theil index, a spatial autocorrelation analysis, and other methods. It was found that the level of provincial sustainable tourismization in China has steadily increased over time, with the eastern region taking the lead. The overall differences and inter-regional differences in terms of the provincial sustainable tourismization level have generally decreased year-by-year. The intraregional differences within the eastern region were found to be the largest, and the rate of contribution of inter-regional differences to overall differences was shown to decrease gradually, while the rate of contribution of intraregional differences within the western region increased gradually. A positive spatial correlation in the provincial sustainable tourismization level was identified, and the spatial agglomeration effect showed an increasing trend. The spatial dependence was mainly characterized by "high-high" (HH) agglomeration, showing a ladder difference of "higher in the east and lower in the west". The results of this study were used to identify where emphasis should be placed in terms of policy and strategy.

Keywords: tourismization; entropy method; Theil index; spatial autocorrelation analysis; temporal and spatial characteristics; sustainability



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1. Introduction

The term "tourismization" refers to a development mode and pathway that integrates, optimizes, and promotes economic and social resources, related industries, the ecological environment, public services, systems, and policies in a certain region. It takes sustainable development as the principle goal, and uses tourism consumption as the platform to achieve this. It aims to realize the integrated development of tourism and the social economy in the region, create a tourism environment shared by society, and drive and promote the coordinated development of the economy, society, and ecology [1–4]. Tourism is a human right and way of life [5]. It is associated with rigid demands in modern society and is an important part of people's well-being [6]. In the era of globalization and information technology, the demand for tourism is continuing to grow, accompanied by the increased popularization of tourism consumption. As one of the driving forces pushing forward the integration of regional economic, social, and cultural factors, tourismization is playing an increasingly prominent role and is gradually gaining a reputation as a significant way to promote the development of the regional economy and society. It has been proposed that it can contribute to sustainable regional development [7]. Tourismization is a universal phenomenon and an integral element of globalization [8]. A wave of tourismization is

taking shape in different areas, especially in developed countries, where the phenomenon is playing roles in economic development, social progress, and the environmental protection of territories. This wave is manifested in the rising proportion of employees engaged in tourism-related industries, the increase in output value of tourism-related industries as a proportion of the gross national economic output value, and the increasing number of tourists relative to the resident population [9,10]. It has an important impact on the development of industry, agriculture, urbanization, and information technology in developed countries [4]. Tourismization has become such a typical phenomenon that urban tourismization is becoming a new direction within urban development. In addition to production and residential functions, in some cities, tourism function has gradually increased in importance [11]. As an essential force to promote the economic development of cities (represented by tourist cities), the tourism industry is becoming more and more closely integrated with the development of cities [10]. Tourism has become, or is becoming, part of the urban system and is changing the original forms of cities [12]. Against this background, tourismization and sustainable tourism have garnered continuous attention from the tourism industry and academia.

Tourism is known to have positive impacts on the economy, society, and environment at national and regional levels. It can be used to solve regional development problems and make positive contributions to the environment and to communities. However, it could also bring negative impacts to societies [7,13]. For example, tourism may lead to the destruction of neighborhood relations, excessive commercialization, traffic congestion, rising prices, an insufficient supply of public facilities, and hidden dangers to the community. Social alerts due to tourist saturation have occurred particularly in historical central areas. It should be pointed out that the concept of tourismization is also considered by scholars to be associated with tourism-phobia and gentrification [11,14,15]. It can also change the nature of an area's heritage [16]. Although more difficult to achieve, tourism sustainability is just as important as any other sector of the human economy [17]. While coping with economic transformation, tourism development should insist on the consideration of sustainability. Instead of tourism centralization, tourism needs to be decentralized to allow sustainable development [13]. Tourism development needs to respond to the natural, social, and economic changes caused by climate change, and continuously aim to adopt environmentally-friendly and resource-neutral development patterns [18]. It also needs to be well-coordinated with the social economy, resources, and environment, and it should effectively promote regional sustainability. The sustainable tourism model is different from the volume growth tourism model. In this model, equity in tourism participation should be promoted, and more attention needs to be paid to service quality to meet the demand for high-quality tourism. It is also necessary to protect the features of the natural and sociocultural environments in which we live and to continuously improve residents' quality of life [19].

Moreover, it must be considered that the COVID-19 pandemic has had a considerable impact on the global tourism industry, bringing long-term negative effects to the growth of tourism. It has also exposed the vulnerability of the tourism industry. This vulnerability has raised considerable questions for tourism development and its related research, triggering society to rethink the tourism growth model [18,20]. COVID-19 has significantly influenced various tourism stakeholders (e.g., tourists, operators, destination organizations, policy makers, local communities, and employees) in terms of society, culture, economy, and psychology, some of which will be long-lasting. Some interest groups, such as micro and small tourism enterprises, exist in unfavorable environments for survival. Many aspects of tourism, such as tourism types, tourism markets, tourism employment, and tourism education, have also been affected to varying degrees. At the same time, this crisis has affected the same types of stakeholder groups in different ways. However, this crisis has also accelerated technological innovations and changes, further enhancing the role of technology in tourism recovery and posing new challenges and requirements for government functions, crisis management, and tourism management [21].

As tourism recovery will take a long time, stakeholders will be required to develop corresponding strategic plans to promote destination recovery and turn the crisis into a development opportunity. In the future, what is under question will be the transformation of a global tourism system into one that is more in line with sustainable development goals [20]. Despite the impact of the COVID-19 epidemic on the global tourism industry, the promising trend in tourism development has not changed because it has become an indispensable part of people's lives. Tourismization will continue to serve as an important force for promoting economic and social development in the post-epidemic era. The tourismization process has impacted the regional economy, society, and environment.

The tourismization process in China is in an active stage, which is characterized by rapid development, and it has become an important practical activity for boosting regional social and economic development. China is now transitioning from an industrial society to a post-industrial society. One dimension of post-industrial society is the change in the economic sector from goods-producing to a service economy [22]. Therefore, the service industry will become the development focus in the post-industrial era. As an important part of the modern service industry, the tourism industry will play an integral role in adjusting the national economic structure, stabilizing China's growth, promoting reform, expanding consumption, and benefiting people. Tourismization, as an important part of modernization, reflects a way of life that is in line with the industrialized production mode and promotes regional, social, and economic development during this transition period [9,23]. The promotion of sustainable tourismization is not only conducive to the implementation of a high-quality national development strategy and the practice of five development concepts of "innovation, coordination, green, openness, and sharing", it is also an important way to enhance rural revitalization and build a healthy and beautiful China [24]. It is also an important way to realize industrialization, urbanization, informatization, and agricultural modernization [4].

The concept of tourismization was first proposed by scholars in the 1980s studying the impact of tourism development. Due to the different perspectives and research directions related to this issue, there are many different terms that describe the issue at hand, for example, touristization, touristification, tourismification, tourismization, and touristifying, and the academic community has not yet formed a unified expression. In a narrow sense, it is "a process in which small parts of urban areas, which are usually residential, develop into complete tourist zones". "The term touristification is often used synonymously with commodification to describe an expansion of the tourism industry and related offers into finally residential neighborhoods [25]". In addition, "tourismification" is a process in which "things" change under the influence of tourism activities [26]. "It is not the mere presence of tourists that is shaping this phenomenon but, rather, the ensemble of actors and processes that constitute tourism as a whole [8]". In a broad sense, "tourismization can be understood as a socio-cultural phenomenon, as a guiding model for the relations created in places and a system of values which marks the way of life of people in places, reflected in discourses and practices", it can also be considered a civilizing process, which reflects a global and universal context guided by the revolutionary power of tourism [3]. This study chose "tourismization" as a subject term because the sociological perspective of "tourismization" was introduced as a framework to explain social transformation [27]. Young [28] first used this concept when studying the impact of tourism development on rural landscapes in 1983. Jansen-Verbeke [12] explained tourismization systematically for the first time when studying the impact of tourism activities on cultural resources. She described all changes occurring under the influence of tourism activities as tourismization. Since then, research on tourismization has gradually developed, and many studies on tourismization based on different perspectives have emerged. These perspectives include a resource-based perspective [8,12,29,30], a globalization-based and whole-society-based perspective [1,2], a tourism essence perspective [31,32], and a regional development strategy perspective [4,10]. In recent years, tourismization has attracted extensive attention in Chinese academic circles. Some scholars have carried out research on the characteristics, impacts, and effects

of tourismization, and an increasing number of scholars have begun to pay continuous attention to the measurement of the tourismization level. In an attempt to determine the meaning and characteristics of tourismization, an evaluation index system was established. This index can be used to assess the tourismization level in different regions, such as single or multiple provinces, cities, or other geographical units [10,24,33–35]. However, a systematic evaluation index system has not yet been formed, and there have been few studies on the tourismization level from the provincial perspective, especially in terms of its spatial–temporal pattern and differences.

Research on tourismization is relatively rich, and has involved different development goals and the formation of evaluation criteria from different perspectives. This study attempted to address the deficiencies in current research. Based on previous studies, this study attempted to understand tourismization from another perspective, starting with an analysis of the theoretical system of sustainable tourismization to construct a comprehensive evaluation index system of sustainable tourismization. Taking 31 provinces in the Chinese Mainland as the research object, we measured the sustainable tourismization level and analyzed the characteristics of the development patterns and the differences in provincial tourismization from dual dimensions of time and space. The purpose of this study was to comprehensively and objectively evaluate the characteristics of sustainable tourismization in China, and to provide a decision-making reference that can be used for the promotion of sustainable tourismization in China and other regions of the world. The main contribution of this paper is the conceptual and empirical framework that was developed and tested on China's provinces.

2. Literature Review

2.1. *Research on Tourismization from a Resource-Based View*

Taking tourismization in traditional fishing villages in Malta as an example, Young [28] focused on the impact of tourism development on the village landscape and put forward a general model of tourismization and landscape changes. This model can be used to explore the relationship between tourism development and village change. Cohen [36] believes that tourism promotes the commercialization of cultural resources. Pretes [37] found that cultural spaces, like Santa Claus in Finland, have been transformed into tourist attractions, leading to tourism consumption. Chang et al. [38] argued that heritage tourism can serve as a feasible approach to promote urban economic development and rebuild urban spaces. These cities have adopted heritage tourism as a strategy to promote urban redevelopment, and the process of tourismization plays an important role in their local economies. Jansen-Verbeke [12] discussed the influence of tourism on cultural resources in a systematic manner, stating that the rapid development of tourism has brought not only new opportunities for historical and cultural cities, but also threats to cultural resources through the process of tourismization. Although Jansen-Verbeke did not carry out an in-depth empirical study on the tourismization of cultural resources, his study provides useful information for other scholars.

Researchers have become increasingly interested in this topic and have tried to use case studies to analyze the causes, processes, and results regarding tourismization. In terms of research theories and methods, research generally follows the paradigm of geography and sociology. Taking the Scottish poet Burns as an example, Bhandari [30] stated that the tourismization of cultural resources is a process in which the authenticity of cultural heritage and cultural symbols is constantly being updated and reconstructed. Cros et al. [39] suggested that one method of cultural tourismization involves relying on the cultural heritage resources of a destination to transform it into a tourism product that can be consumed by tourists. This concept can be integrated into tourism products and marketing management. Jansen-Verbeke et al. [40] pointed out that the study of processes involved in the tourismization of former war sites and landscapes is interdisciplinary, while Roigé et al. [16] argued that excessive “tourismization” might undermine the importance of heritage to the local community and may change its nature. By analyzing the daily lives of

the community in the Colombian Pacific in terms of social aspects, García [41] advanced some tourismization strategies from the perspective of the economic interests of politicians, businessmen, and members of the community. By combining ethnographic research and discourse analysis of texts surrounding local protests in the village of Bil'in, Belhassen et al. [42] depicted the birth of a political tourism destination through the process of tourismization. Transnational activists and political tourists in the village play important roles in this process. In another example, by applying a geography method and using Shichahai, Beijing as a case study, Wang et al. [43] discussed the inner order of space and function in tourismization or tourism development in historic areas.

In early research on tourism, Chinese scholars mostly studied tourismization as a development strategy and resource development method [4]. Most argued that the tourismization and utilization of natural and cultural resources utilize resources in a way that not only caters to the needs of mass tourism but also makes rational use of resources. With increasing attention being paid to cultural heritage by the state, Chinese scholars have proposed that tourismization is an important approach for the development, utilization, and protection of cultural heritage, especially intangible cultural heritage. They have also discussed the survival of intangible cultural heritage through tourismization using examples. Tourismization is an innovative method to allow "intangible cultural heritage" to survive and it can effectively develop folk culture, creating a suitable living environment and conditions for intangible cultural heritage to thrive and helping to enhance the public's awareness of "intangible cultural heritage" protection. It assists in the promotion of the protection, inheritance, and development of intangible cultural heritage [44]. However, improper tourismization of resources can have negative effects, for example, the commercialization and degradation of local cultural value due to the tourismization of heritage sites [45].

From the perspective of tourismization as a phenomenon, scholars have mainly focused on the causes, processes, and results or impacts of tourismization. Research objects include, but are not limited to, cultural resources, geological resources, tangible and intangible heritage resources, rural areas, historic areas, urban areas, and conflict zones.

2.2. Research on Tourismization from Other Perspectives

The first focus was the study of tourismization from the perspective of globalization and the whole society. Salazar [1] conducted a study on tourismization from the perspective of globalization and stated that, in the context of globalization, it might affect the lives of locals, making them reliant on tourism for their livelihoods, and causing them to gradually lose their sense of cultural pride. In the context of specific tourism activities, residents, as tour guides, cater to different preferences of international tourists in various ways. Salazar also stated that tourismization is a contradictory process, and it provides a good research perspective for global localization research. Seng [2] conducted research on the tourismization of Singapore, stating that the tourism industry has played a significant role in the social and economic development of Singapore and has become an integral part of social development. The local government attaches great importance to the development of tourism. Starting from the needs and rights of tourists, it has improved public spaces and the city's infrastructure so that tourists can have the same local experience as local people and know what it means to be "Singaporean". Ooi [46] described the tourismization of three national museums in Singapore in the context of the orientation process. These museums are part of the plan to make Singapore more oriental. In this process, Singapore aims to fulfill tourists' images and expectations of the country, while the tourists also influence the cultural landscape of the country. Andrade et al. [47] stated that the tourismization of European port cities is a process that accompanies globalization and promotes cities as products or destinations for vacations or business. Nofre [48] argued that tourismization related to nightlife has had negative impacts on spaces and society in central historic neighborhoods of lots of European cities, so it is necessary to strengthen the social and cultural value of nightlife. Taking the Seochon and Bukchon areas of Seoul in Korea as

examples, Kwon et al. [49] pointed out that tourismization promotes tourism development by changing urban spaces, which affects residents along with the commercial and social structures of communities. By applying the spillover theory, Woo et al. [50] verified the impacts of tourismization on residents' quality of life. Wang [51] was the first Chinese scholar to conduct systematic research on the phenomenon of tourismization. He stated that tourismization is a socioeconomic and sociocultural process that transforms society and its environment into landscapes, attractions, sports grounds, and consumption venues.

The second focus has been the study of tourismization from the perspective of tourism essence. Franklin [31] reviewed other scholars' research on tourismization and stated that some scholars' structuralist research ignored the structural logic relationship. He also pointed out that tourismization is regarded as a marginal field in terms of social and economic development and spatial development, and research on tourism theory is often hindered by narrow structuralism, which prevents in-depth research on theory, resulting in the field of tourism having insufficient theorization. Starting from the ontology of tourism, Franklin analyzed tourismization deeply. He stated that tourism is essentially an "ordering" phenomenon and has formed a series of social "ordering effects", among which tourismization is an important ordering effect that makes some components and phenomena in society tend to be orderly.

2.3. Study on Tourismization Level Measurement

In recent years, scholars, especially Chinese scholars, have begun to pay close attention to measurement of the tourismization level, and have studied the measurement and effects of various samples based on establishing an evaluation index system. Scholars constructed an evaluation index system using indicators from several dimensions. Then, they conducted a comprehensive evaluation of the tourismization level of some regions, provinces, cities, and villages. The spatial-temporal pattern, evolution characteristics, and effects of the tourismization level were also analyzed.

It is challenging to develop a more accurate evaluation index system for tourismization because researchers have not yet reached a consensus on its definition and have different perspectives on tourismization research. Measurement of the tourismization level has usually adopted the composite index method. Due to the different perspectives considered in this study, the selected index system used was also different, as shown in Table 1.

Table 1. Empirical Assessments of Tourismization.

| Study | Geographical Scope | Indicator Dimensions | Number of Indicators | Period | Method |
|-------------------------|---|---|----------------------|-----------|------------------------------|
| Parralejo et al. (2021) | Multiple destinations (Urban Areas of Seville and Cádiz) | Housing and tourist rentals, Socio-demographic changes | 12 | 2001–2018 | Exploratory analysis |
| Xia et al. (2019) | Multiple destinations (9 provinces in the China Section of the Silk Road Economic Belt) | Tourism effect, Tourism revenue, Tourism industry, Tourism employment | 8 | 2005–2016 | Entropy method |
| Li et al. (2018) | Multiple destinations (31 provinces in China) | Resource advantage, Business capacity, Scale level of the tourism industry, Market capacity | 14 | 2014 | Principal component analysis |
| Zhang et al. (2017) | Multiple destinations (31 provinces in China) | Tourism industry scale, Economic function of tourism, Social function of tourism, Cultural function of tourism, Education function of tourism, Ecological function of tourism, Organizational function of tourism | 25 | 2005–2015 | Entropy method |

Table 1. Cont.

| Study | Geographical Scope | Indicator Dimensions | Number of Indicators | Period | Method |
|---------------------|--|---|----------------------|-----------|---|
| Wang et al. (2014) | Multiple destinations (17 cities in Shandong) | Tourism industry scale, Economic function of the tourism industry, Social function of the tourism industry, Cultural function of the tourism industry, Ecological function of the tourism industry, Organizational function of the tourism industry | 23 | 2001–2011 | Entropy method, Gray relational analysis method |
| Wang et al. (2014) | Multiple destinations (Nationwide and 31 provinces in China) | Tourism industry scale, Economic function of the tourism industry, Social function of the tourism industry, Cultural function of the tourism industry, Education function of the tourism industry, Ecological function of the tourism industry, Organizational function of the tourism industry | 35 | 2000–2011 | Entropy method, Gray relational analysis method |
| Li (2013) | Multiple destinations (26 cities in China) | The contribution level of tourism economy, The development level of tourism industry, Tourism employment capacity, Tourism industry scale, Tourism industry relevance, The investment level of tourism industry, The reception scale of tourism industry, Tourism resources endowment | 8 | 2001–2009 | Multiobjective decision making method |
| Zhang et al. (2013) | Multiple destinations (11 coastal provinces in China) | NA | 17 | 2000–2010 | Principal component on TOPSIS method |

A composite index system is mainly divided into the following types.

The first type primarily includes two areas of evaluation: rental housing and sociodemographic characteristics. The former includes housing-related indicators such as the number and price of dwellings and rental houses, while the latter includes population-related indicators such as the resident population and foreign population sizes. These indicators are mainly set from a geographical perspective and are often used to analyze the social and spatial effects of tourismization processes in historic centers.

The second type is based on the general framework of systematic development used in the tourism industry to build the index system. This framework includes resource advantages, industrial strength, industrial development scale, market capacity, and other dimensions. This kind of index system mainly focuses on the tourism industry. It involves indicators that primarily reflect the supply and demands of the tourism industry, such as the development level, scale, industrial relevance, investment level, reception scale, tourism resource endowment, and other indicators related to the tourism industry.

The third type is based on two groups of classification for indicator setting, that is, the tourism industry scale as well as the comprehensive functions of the tourism industry. Its focus is on highlighting the role of the tourism industry function. The scale of the tourism industry includes the tourism market demand and tourism industry supply capacity. The comprehensive functions of the tourism industry include economic, social, cultural, educational, ecological, and organizational functions. More systematic indicators are involved in this kind of index system compared to others, and the selected indicators are more extensive. They include not only the internal indicators related to the tourism industry system but also external indicators affecting the development of the tourism industry. Table 2 shows a representative comprehensive tourismization evaluation index.

Table 2. A Representative Comprehensive Tourismization Evaluation Index (Taken from Zhang etc. (2017) and Wang etc. (2014)).

| Tourism Industry Scale | Economic Function of Tourism | Social Function of Tourism | Cultural Function of Tourism | Education Function of Tourism | Ecological Function of Tourism | Organizational Function of Tourism |
|---------------------------------------|--|--------------------------------|---|--|---|--|
| Total number of tourists | Total tourism revenue | Number of tourism employees | Traffic grade highway density | Number of students in tourism colleges per 10,000 people | Proportion of park green areas in urban green areas | Correlation Coefficient of Tourism and Primary Industry |
| Growth rate of total tourist arrivals | Growth rate of total tourism revenue | Tourism labor productivity | Passenger turnover | Density of tourism schools | Area of green parks per capita | Correlation coefficient of tourism and secondary industry |
| Tourism industry supply | Proportion of GDP represented by total tourism revenue | Ratio of tourists to residents | Proportion of inbound tourists | | | Correlation coefficient of tourism and the tertiary industry |
| Density of travel agencies | Proportion of the tertiary industry represented by total tourism revenue | Tourism expenditure per capita | Average number of days stayed by inbound tourists | | | |
| Star hotel density | | | | | | |
| Density of tourist attractions | | | | | | |

By comparing the latter two indicator system types, it was found that some of the indicators overlap, such as the total tourism revenue, the proportion of GDP represented by the total tourism revenue, the proportional contribution of the total tourism revenue to the added value of the tertiary industry, and the level of tourism consumption per capita. These are all key indicators of the tourism industry system or sustainable tourism, reflecting the status quo of the tourism industry characteristics, including the scale of the tourism industry, the industrial status, and tourism economic development. This result is mainly because scholars from different disciplines, such as economics and geography, differ in the division of dimensions, resulting in different dimensions of the same indicator existing in different indicator systems.

Overall, previous studies in this area have varied in terms of research perspectives and evaluation index system construction, but research methods and contents have shown a degree of consistency, as follows. First, a multi-index system instead of a single index

has generally been used to evaluate tourismization, because a single index cannot comprehensively evaluate tourismization. Second, a quantitative analysis has often been adopted to convert indicators reflecting the characteristics and objectives of tourismization into quantifiable indicators. Third, the analytic hierarchy process, principal component analysis, coefficient of variation, and entropy method have been the most frequently used evaluation methods [35]. The evaluation index systems and evaluation methods used in previous research have provided enlightenment and acted as references for further research in the later stages, but there are still some areas that need to be discussed and solved. First, there are limitations in the evaluation of tourismization. Most scholars have focused on the evaluation of tourism industry development and the tourism economy as well as the main factors involved in tourism development [10,34,52]. Some scholars have focused on the evaluation of the economic, social, cultural, and ecological effects and functions of tourism [33,53], while others have evaluated the social, economic, and ecological development environments that the tourism industry rely on. The main reason for this difference is that there are differences in scholars' understanding of the connotations and characteristics of tourismization, as well as differences in research perspectives. Second, the selection of indicators needs to be improved. Previous studies have mostly adopted absolute indicators that reflect the total amount and development level of tourism, and indicators reflecting the quality and benefits of tourism have been relatively insufficient. In order to avoid deviations in population, land, and economic aggregates in different regions, some relative quantity indicators can be selected for measurements in the later stage. Third, the connotations and characteristics of tourismization need to be further discussed and considered, and this discussion will have a decisive impact on the construction of a tourismization evaluation index system.

It is undeniable that scholars will have different levels of understanding of tourismization under different research perspectives. In reverse terms, in the process of so-called tourismization, high-intensity and unrestricted tourism development will lead to the decline of tourist destinations [54]. Overtourism or misconduct of tourism development will aggravate social conflicts and have negative impacts on the quality of life of residents [55]. However, we cannot deny that the process of tourismization is of great significance, and it is important to promote sustainable tourismization at present and in the future. Thus, this study aims to interpret the connotations of sustainable tourismization, ascertain how to construct a scientific evaluation index system, and explore the level and development characteristics of sustainable tourismization in China. Finally, this study aims to put forward suggestions on enhancing sustainable provincial tourismization in China.

3. Methods and Materials

3.1. Research Methods

Since index construction is most suitable for comparing different spatial units, this study took index construction as the premise of the data analysis. The improved entropy method was used to calculate the indicator weight, and then the index score for each region was obtained. The Theil index and spatial autocorrelation analysis were used to compare and analyze the differences in, and spatial characteristics of, the provincial tourismization level.

3.1.1. Improved Entropy Method

The thermodynamic entropy method used in physics was altered so that it could be applied to social systems. In this method, the dispersion degree of an index can be judged by calculating the index information entropy in accordance with the characteristics of entropy: the smaller the index entropy value, the greater the dispersion degree and the greater the impact of the index on a comprehensive evaluation. The entropy method is an objective and comprehensive evaluation method that does not require an a priori structure and is more suitable for the evaluation of multiple indicators, because it can avoid the interference of human factors, effectively solve the problem of information overlap among

index variables, and reflect the utility of the index information entropy. The common entropy method is primarily used for the analysis of cross-sectional data. In the present study, the improved entropy method was used to objectively evaluate China's sustainable tourismization index. The improved entropy method adds time variables to the original entropy method, so it is suitable for analyses where the sample matrix involves panel data, and it can compare different years. The specific evaluation model used was as follows:

- (1) To construct the original index data matrix, assume that there are r years, m provinces, and n evaluation indexes. The original index data matrix is expressed as $X = \{x_{\theta ij}\}_{r \times m \times n}$ ($1 \leq \theta \leq r, 1 \leq i \leq m, 1 \leq j \leq n$), where $x_{\theta ij}$ is the index value of the j -th item of the i -th province in the θ -th year. In this study, r , m , and n were 10, 31, and 17, respectively.
- (2) Regarding standardized processing of raw index data, the range method is used for dimensionless processing of the original data, using the following formula:

$$x'_{\theta ij} = (x_{\theta ij} - x_{min}) / (x_{max} - x_{min}) \quad (\text{Positive indicator})$$

$$x'_{\theta ij} = (x_{max} - x_{\theta ij}) / (x_{max} - x_{min}) \quad (\text{Negative indicator})$$

where $x'_{\theta ij}$ is the dimensionless value of the j -th index of the i -th province in the θ -th year, and x_{max} and x_{min} are the maximum and minimum values of different indexes j in all evaluation objects, respectively.

- (3) For the normalization of indexes, use the following equation:

$$y_{\theta ij} = x'_{\theta ij} / \sum_{\theta=1}^r \sum_{i=1}^m x'_{\theta ij} \quad (1)$$

- (4) To calculate the entropy e_j of each index, use

$$e_j = -k \sum_{\theta=1}^r \sum_{i=1}^m y_{\theta ij} \ln y_{\theta ij} \quad (2)$$

where $k = 1 / \ln(r \times m)$.

- (5) To calculate the redundancy d_j of the entropy value of each index, use

$$d_j = 1 - e_j \quad (3)$$

- (6) To calculate the weight w_j of each index, use

$$w_j = d_j / \sum_{j=1}^n d_j \quad (4)$$

- (7) To calculate the comprehensive score $S_{\theta i}$ of the sustainable tourismization level of each province in each year, use

$$S_{\theta i} = \sum_{j=1}^n w_j \times x'_{\theta ij} \quad (5)$$

3.1.2. Theil Index

The Theil index is an index used to calculate income inequality based on the entropy concept in information theory. The index divides the overall regional differences into intragroup differences and intergroup differences, which can directly reflect regional differences and their sources. Its advantages are that it can be used to analyze not only the overall differences but also the inter-regional and intraregional differences as well as their

respective contribution rates and levels of importance relative to overall differences. The specific formula is as follows:

$$T = \frac{1}{n} \sum_{i=1}^n \frac{y_i}{\bar{y}} \log\left(\frac{y_i}{\bar{y}}\right) \quad (6)$$

where T represents the Theil index of sustainable tourismization, n refers to the total number of samples, y_i represents the sustainable tourismization level of the i -th province, and \bar{y} denotes the average level of sustainable tourismization in China. $T \in [0, 1]$ indicates that the smaller the value is, the smaller the regional difference is. Conversely, the larger the value is, the greater the regional difference is.

By further decomposing the Theil index, we get

$$T = T_b + T_w = \sum_{k=1}^K y_k \log \frac{y_k}{\frac{y_k}{n_k}} + \sum_{k=1}^K y_k \left(\sum_{i \in g_k} \frac{y_i}{y_k} \log \frac{y_i}{\frac{1}{n_k}} \right) \quad (7)$$

where T_b and T_w refer to intragroup differences and intergroup differences, respectively; k represents the k -th region; n_k stands for the number of provinces in the k -th region; y_k represents the proportion of the national average sustainable tourismization level represented by the sustainable tourismization level; and y_i denotes the proportion of the sustainable tourismization level of the k -th region taken up by the sustainable tourismization level of the i -th province.

3.1.3. Spatial Autocorrelation Analysis

Spatial autocorrelation analysis is a spatial statistical method that can be used to reveal the regional structure of spatial variables. It can be divided into global spatial autocorrelation and local spatial autocorrelation. The global spatial autocorrelation method can be used to analyze the overall distribution characteristics of observed values, summarize the spatial dependence degree in the overall spatial scope, and reflect the spatial difference degree between different regions to a certain extent. The local spatial autocorrelation method can be used to analyze the spatial characteristics of a local space, describe the similarities between the spatial unit and its domain, and make up for the deficiencies of the global spatial autocorrelation analysis. The most commonly used correlation index is Moran's I . The global Moran's I is used to analyze spatial agglomeration across a whole country, while the local Moran's I is adopted to illustrate agglomeration around a region from a region-based perspective. Spatial autocorrelation analysis was carried out with ArcGIS and GeoDa spatial analysis software.

The global Moran's I is calculated as follows:

$$\text{Global Moran's } I = \frac{\sum_{i=1}^n \sum_{j=1}^n W_{ij} (x_i - \bar{x})(x_j - \bar{x})}{S^2 \sum_{i=1}^n \sum_{j=1}^n W_{ij}} \quad (8)$$

where n represents the number of provinces (cities or regions) in China, $S^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$, W_{ij} is the spatial weight matrix composed of i and j , x_i denotes the value of the i -th province (city or region), and \bar{x} represents the average provincial (urban or regional) value in China. Generally, $I \in [-1, 1]$. $I > 0$ indicates a positive correlation, and the larger the value of I , the stronger the positive correlation. $I < 0$ denotes a negative correlation, and the smaller the value of I , the stronger the negative correlation. $I = 0$ means that there is no spatial correlation between the distributions of provincial and municipal data, and the data are randomly distributed.

The local Moran's I is calculated as follows:

$$\text{Local Moran's } I = \frac{(x_i - \bar{x})}{S^2} \sum_{j=1}^n W_{ij} (x_j - \bar{x}) \quad (9)$$

where $I > 0$ indicates that values of the same type are adjacent, i.e., high values are adjacent to high values and low values are adjacent to low values; $I < 0$ denotes that high values are adjacent to low values.

3.2. Data Sources

Considering the availability and continuity of data, the panel data of 31 provinces (municipalities and autonomous regions) in Chinese Mainland from 2009 to 2018 were selected to measure and analyze the sustainable tourismization level of each province. The basic data came from the following three source types: First, we used official statistical yearbooks, including the China Statistical Yearbook (2010–2019), China Tourism Statistical Yearbook (2010–2018), Chinese Culture and Tourism Statistical Yearbook (2019), and provincial statistical yearbooks, to ensure the unity of the data acquisition methods. Second, we used data from other authoritative organizations and platforms, including DMSP/OLS (2009–2013) night light image data and VIIRS/DNB(2014–2018) night light image data downloaded from the National Geophysical Data Center (NGDC) website of the United States, which effectively made up for the index data that was not included in statistical yearbooks. Since the data came from different satellites, we conducted mutual calibrations, time continuity corrections, and supersaturation corrections for the two sets of original data. Third, we used Internet data. We made full use of the rich index content available in the era of big data, including the Baidu index. The use of multiple data sources ensured the accuracy of the obtained data and the scientific nature of the research results. In addition, per capita tourism revenue is the sum of the domestic tourism revenue and the inbound tourism revenue, where the inbound tourism revenue is converted into RMB according to the current exchange rate. Therefore, most of the data were selected from the official statistical databases of China's National Bureau of Statistics, the Ministry of Culture and Tourism, and the statistics department of each province. The statistical caliber is relatively consistent, and the data sources are reliable. The reliability and accuracy of the research data can be guaranteed.

4. Establishment of the Index System

4.1. Theoretical Analysis Framework of Sustainable Tourismization

“By adding the suffix ‘ation’ to tourism, it means that tourismization becomes a historical process of construction of a phenomenon associated with a process of internalization of the different facets of tourism by people who have influence in the relations and the way of life of a certain place [3]”. Tourismization is a comprehensive system that requires a spatial–temporal perspective to understand. Tourismization not only describes the process of tourism development itself but also reflects the transformation of the socio-economic development mode. It aims to improve people's quality of life and promote social civilization and harmony. Furthermore, it is considered to be a process in which economic, social, cultural, educational, ecological, and other functions of tourism are fully brought into play [53]. Therefore, the understanding of tourismization needs to return to the practice of tourism development, and its connotations should be studied from multiple dimensions and perspectives. This study attempted to analyze tourismization from the perspectives of economy and geography. By drawing on the analysis frameworks developed by [9,35,53], and combining the economic, social, cultural, and ecological functions of tourism, sustainable tourismization can be divided into three aspects: consumption tourismization, spatial tourismization, and industrial tourismization. These are the main components of interest when measuring the comprehensive development level of tourismization. The specific theoretical analysis framework used in this study is shown in Figure 1.

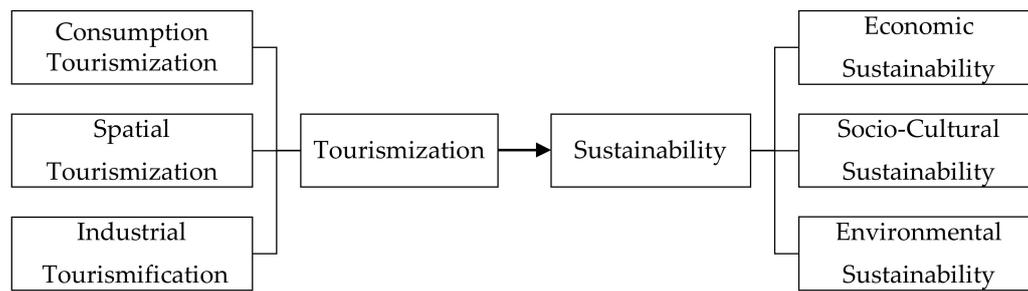


Figure 1. Theoretical analysis framework of sustainable tourismization, (Source: Compiled by the authors, 2021).

Among these three aspects or dimensions, consumption tourismization and industrial tourismization are components of the economic perspective, and spatial tourismization is a component of the geographical perspective. These three dimensions were chosen for the following reasons: In the process of tourismization, the sustainable consumption and production pattern adopted by the tourism industry, as well as the mode of utilization and the efficiency of resources and space, can accelerate the process of sustainability. At the same time, the transformation and upgrade of consumption and the integration of industries through tourism can enrich regional development. Tourism consumption and aggregation of the population and industries brought about by tourism development provides impetus for regional development. Moreover, the consumption and production of tourism need to be completed in specific geographical spaces [56].

Tourismization is manifested as a complex process of change regarding socio-economic dynamics and the landscape and environmental components of a territory. This concept goes beyond the overdevelopment of tourism activity and mass tourism [57]. It involves dependence and influence on the economy, society, and environment. By giving full play to the multiple functions of tourism in the regional ecology, economy, society, and culture, tourismization can promote economic, social, cultural, and environmental sustainability. Each of these dimensions reflects one or more functions of tourism. These three dimensions jointly reflect the process and results of tourismization and play a comprehensive role in sustainable development. The concept of sustainability permeates into the dimensions, and regional sustainable development can also promote the process of tourismization.

We now elaborate on the three core dimensions:

Consumption tourismization is the most direct manifestation of tourismization, and it is one of the core indicators for testing tourismization. It reflects the social, cultural, and economic functions of tourism. First, tourism is a form of social interaction activity and an important embodiment of cross-cultural communication. Frequent tourism activities will promote the collision and integration of diverse cultures. In addition, with the increasing popularity of tourism consumption, residents' consumption patterns, consumption structure, and consumption levels will also change. This consumption is mainly manifested in a continuous increase in the proportion of residents' daily consumption taken up by service consumption for travel and leisure. From an overall regional perspective, consumption tourismization includes regional endogenous consumption and external consumption. It emphasizes the important roles of tourism, leisure, and other types of consumption in the regional social economy. As an essential component of the consumer lifestyle, tourism promotes the shift and accumulation of the population, materials, and capital to specific regions [58].

Spatial tourismization describes the tourismization process in geographical space and serves as spatial support to tourismization. This dimension reflects the ecological, social, and cultural functions of tourism. No tourism activity can exist without actual space. Thus, from the perspective of geography, tourismization refers to a complex process of territorial transformation brought about by tourism in a defined geographical space. The analysis of phenomena in specific territory is emphasized. This process also inevitably involves relationships between stakeholders, and their relationships with specific spaces [57]. These

relationships are mainly reflected by the two-way flow of tourists and residents in geographical space and the various changes and relationships caused by this mobility. For instance, regional tourismization leads to changes in social demographics and residential space [11,15]. Tourism activities require a good living environment, ecological environment, infrastructure, and service facilities. Regional tourismization is inseparable from the sustainable development and utilization of natural and sociocultural resources. Cultural tourismization is a typical type of regional tourismization. In this process, tourists and residents share living and production spaces and certain spaces are created that can be shared by residents and tourists.

Industrial tourismization describes tourismization at the industrial level, serving as the foundation and driving force of tourismization. This dimension fully reflects tourism's economic and social functions, as tourism plays roles in economic growth, employment, and the regional economic structure. With the continuous expansion and blurring of the boundaries of the tourism industry, the types of industry and the number of enterprises that provide products and services for tourism consumption continue to increase, the population providing tourism services and the investment in tourism-related fields are growing, and the supporting role of the regional economy in industrial integration is being strengthened. At the same time, tourism development is promoting industrial agglomeration and the development of related industries [56]. Tourism and related industries continue to be important driving forces for national and regional economic growth [59].

Therefore, sustainable tourismization is a way to promote national and regional socioeconomic development, the internal unity of consumption tourismization, spatial tourismization, and industrial tourismization. The logical goal is to achieve sustainable development and public happiness by promoting harmonious development of the regional economy, society, culture, and ecology. Tourismization is a phenomenon that appeared in the tide of post-industrial development, a process that focuses on tourism consumption to promote social and economic development and that widely affects the quality of life of residents. It is also a dynamic process of sustainable promotion. At the same time, it is also a result, a kind of "ordering effect" [32]. Tourismization will help to alleviate the contradictions and problems associated with the urban-rural dual structure and the dual regional structure, facilitate the development of other industries, optimize the regional industrial structure, and improve the living environment of residents, which is of great significance for promoting China's social and economic development under the new development pattern.

4.2. Comprehensive Evaluation Index System of Sustainable Tourismization

To construct a comprehensive evaluation index of tourismization, the systematization and the applicability of the reference evaluation system should be considered first. The characteristics of China's tourismization should also be considered. The comparability of data in all regions cannot be ignored.

Combined with the broad concept of tourismization, and based on the understanding of the connotations and characteristics of tourismization, a representative and operable comprehensive evaluation index (CSI) of sustainable tourismization was constructed using three dimensions and according to the principles of scientificity, objectivity, comprehensiveness, and hierarchy in index selection. The three dimensions considered were consumption tourismization, spatial tourismization, and industrial tourismization. The CSI index was used to measure the sustainable tourismization level in China (Table 3). We considered index systems and indicators used in previous research, such as tourismization indicators [11,15,53,56], tourism sustainability indicators [60–63], and sustainable urban development indicators [64,65]. A total of 17 representative indicators were selected, including socio-cultural, economic, environmental indicators and tourism-related indicators. To eliminate the measurement deviations caused by differences in the population, land area, and economic aggregation in different provinces, relative indicators were selected where possible.

Table 3. Comprehensive Evaluation Index System of sustainable tourismization.

| Criterion. | Element | Indicator | Indicator Interpretation |
|--|---|--|---|
| Consumption Tourismization (CT) | Tourism consumption structure of residents | Tourism Engel coefficient | (transportation and communication expenses + education, culture and entertainment expenses + health care expenses)/total consumption expenses (%) |
| | Tourism consumption level of residents | Per capita expenditure on education, culture, and entertainment | Total Personal Education, Culture, and Entertainment Consumption of Residents/Average Annual Population (Yuan/Person) |
| | Driving force of tourism consumption | Per capita tourism revenue | Total tourism revenue/resident population (thousand yuan/person) |
| Spatial Tourismization (ST) | Tourism reception scale | Proportion of tourists to residents | Total tourist visits/number of permanent residents (visit/person) |
| | Tourism reception environment | Per capita public green area | Urban road area/urban permanent population (m ² /person) |
| | | Per capita urban road area | Urban road area/urban permanent population (m ² /person) |
| | Tourism reception level | Number of public transport vehicles per 10,000 people | Number of standard public transport vehicles/urban resident population (standard vehicles/10,000 people) |
| | | Number of guest rooms (suites) in star hotels per 10,000 people | Number of rooms in star-rated hotels/number of permanent residents (rooms/10,000 people) |
| | Traffic accessibility | Traffic network density | (total railway mileage + total highway mileage)/total regional land area (km/100 sq km) |
| | Travel conditions of residents | Number of private cars per 1000 people | Private car ownership/number of permanent residents (vehicles/1000 people) |
| Passenger turnover | | ∑ (passenger traffic × transportation distance) (100 million man-kilometer) | |
| The degree of tourism information flow | Tourism information gathering capacity | Inward degree centrality of tourism information flow network nodes | |
| | Tourism information diffusion capacity | Outward degree centrality of tourism information flow network nodes | |
| Industrial Tourismization (IT) | The development status of the tertiary industry | Proportion of the GDP represented by the added value of the tertiary industry | Added value of the tertiary industry/GDP (%) |
| | | Proportion of tertiary industry employees | Employment in tertiary industry/total employment (%) |
| | The development level of tourism elements | Proportion of the GDP represented by total retail sales of social consumer goods | Total retail sales of social consumer goods/GDP (%) |
| | Economic vitality at night | Night light index | Mean DN of night light |

Consumption tourismization: This dimension comprises three aspects, which are the tourism consumption structure of residents, the tourism consumption level of residents, and the driving force behind tourism consumption. Some indicators were selected from tourism consumption indicators used in the previous tourismization index and economy development indicators used in the sustainable urban development index. The tourism

consumption structure of residents was determined by the proportion of total consumption represented by tourism-oriented spiritual consumption, measured by the tourism Engel coefficient, which is a key indicator for measuring the level and structure of residents' tourism consumption. The tourism consumption level of residents reflects the consumption concept and consumption ability of different income groups to use services other than daily life goods. It mainly focuses on tourism and leisure and is measured by the per capita expenditure on education, culture, and entertainment. The driving force behind tourism consumption reflects the impact of tourism consumption on local economic growth and is measured by the per capita tourism revenue. In addition, education expenditure was included for two reasons. First, education, culture, and entertainment expenditure are aggregated and have not yet been divided in the China Statistical Yearbook. Moreover, tourism, in broad terms, is related to culture, education, and learning, and it has penetrating effects on these aspects. Spiritual and cultural demand is a major type of tourism demand, and spiritual consumption is an essential part of tourism consumption. It incorporates culture and education consumption as well as aesthetic and entertainment consumption. It has been found that education-related tourism types, such as study and research travel and cultural tourism, have become consumption hotspots, and their market share has expanded in recent years.

Spatial tourismization: This dimension is represented by the tourism reception scale, tourism reception environment, tourism reception level, traffic accessibility, travel conditions of residents, and information tourism degree, among other aspects. Some of these indicators were derived from the sustainable urban development index, including indicators related to the population, land, transport, and infrastructure. Some were selected from the tourism sustainability index and tourism–urbanization–ecological environment system. The tourism reception scale reflects the number of tourists relative to the number of permanent residents, which also reflects the transnationalization level of central areas [15]. It is also an important manifestation of the local cultural carrying capacity and has direct or indirect impacts on various local reception facilities. The tourism reception scale index was measured by determining the ratio of tourists to residents. The tourism reception environment was analyzed using indicators that reflect the overall urban environmental level and the residents' quality of life, including the per capita public green area and the per capita urban road area. The former reflects the urban ecological leisure environment, while the latter reflects urban traffic congestion and urban road construction. The tourism reception level incorporates the improvement of infrastructure, such as public transportation, and tourism service facilities, such as hotels. It considers the number of public transport vehicles per 10,000 people and the number of guest rooms (suites) in star hotels per 10,000 people to represent infrastructure development and the service level, the tourism supply level, and the reception capacity, respectively. The spatial heterogeneity of tourism means that transportation is a basic type of support and necessary condition for realizing tourism activities. Traffic accessibility helps to improve accessibility in a region and increases the attraction level of destinations, thus expanding the scale of the tourist market. It also serves as the foundation and guarantee of regional tourism integration. It is measured by the traffic network density and concretely reflects the transportation infrastructure level and connections between different attractions within and between regions. The travel conditions of residents were determined by two indicators, namely, the number of private cars per 10,000 people and the passenger turnover. The former reflects the travel frequency and self-help travel conditions of residents, while the latter is an important basis for measuring the transportation capacity and tourism market scale. Information is the subject of network information space flow. The degree of tourism information flow can be used to measure the regional tourism information flow and the positions of nodes in the tourism information flow network. It is expressed by the tourism information gathering capacity and the tourism information diffusion capacity. The results obtained through the network popularity analysis and social network analysis can also indirectly reflect the tourism flow direction, residents' willingness to travel, tourism demand, and intended tourism spaces.

Some indicators of the carrying capacity (per capita public green area, traffic network density, etc.) are used to indicate the carrying capacity and reception level of regional geographic space and the supply status of regional ecological space and facilities. They can also reflect the advantages of regional ecological resources and spatial expansion ability.

Industrial tourismization: The development status of the tertiary industry, the development level of tourism elements, and the economic vitality at night are important indicators of industrial tourismization. These are indicators of the tourismization index, sustainable tourism index, and sustainable urban development index. Some of the indicators are related to the urban economy and service economy. The development status of the tertiary industry provides an industrial base and competitiveness for the integration and development of tourism and other industries. Moreover, it reflects the development level of tourism-related industries, the position of the tourism economy in the regional national economy, and the intensity of labor force absorption. It includes two leading indicators: the proportion of the GDP accounted for by the added value of the tertiary industry and the proportion of employees in the tertiary industry. These factors represent the economic contribution and employment contribution of tourism-related industries, respectively. The development level of tourism elements is measured by the contribution of total retail sales of social consumer goods to the GDP, which reflects the development levels of accommodation, shopping, and entertainment related to tourism. The night light index reflects the regional economic vitality at night as well as the regional economic development level throughout the day and the tourism activity intensity at night.

5. Results

5.1. Comprehensive Evaluation Index of Sustainable Tourismization

Based on the CSI index system mentioned above, the improved entropy method was used to calculate the sustainable tourismization index scores of 31 provinces (municipalities and autonomous regions) on the Chinese mainland from 2009 to 2018. The results are shown in Table 4.

Table 4. Sustainable provincial tourismization level in China from 2009 to 2018.

| Region | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Average Value |
|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|
| Beijing | 0.6174 | 0.6049 | 0.6184 | 0.6394 | 0.6535 | 0.6426 | 0.6491 | 0.6562 | 0.7203 | 0.6694 | 0.6471 |
| Tianjin | 0.3456 | 0.3600 | 0.3982 | 0.4215 | 0.4601 | 0.4410 | 0.4491 | 0.4766 | 0.5144 | 0.4990 | 0.4366 |
| Hebei | 0.2059 | 0.2168 | 0.2386 | 0.2551 | 0.2556 | 0.2687 | 0.2855 | 0.3036 | 0.3417 | 0.3556 | 0.2727 |
| Shanghai | 0.4735 | 0.4991 | 0.5127 | 0.5261 | 0.5456 | 0.5401 | 0.5616 | 0.5812 | 0.6103 | 0.6206 | 0.5471 |
| Jiangsu | 0.3270 | 0.3412 | 0.3738 | 0.3952 | 0.4080 | 0.4190 | 0.4346 | 0.4468 | 0.4782 | 0.4904 | 0.4114 |
| Zhejiang | 0.3334 | 0.3453 | 0.3657 | 0.3853 | 0.4120 | 0.4210 | 0.4277 | 0.4436 | 0.4736 | 0.4898 | 0.4097 |
| Fujian | 0.2155 | 0.2094 | 0.2265 | 0.2433 | 0.2544 | 0.2775 | 0.2823 | 0.3024 | 0.3479 | 0.3666 | 0.2726 |
| Shandong | 0.3372 | 0.3410 | 0.3630 | 0.3807 | 0.3942 | 0.3965 | 0.4007 | 0.4110 | 0.4505 | 0.4579 | 0.3933 |
| Guangdong | 0.2793 | 0.2938 | 0.3252 | 0.3534 | 0.3395 | 0.3664 | 0.3613 | 0.3808 | 0.4063 | 0.4255 | 0.3532 |
| Hainan | 0.2485 | 0.2606 | 0.2695 | 0.2891 | 0.3005 | 0.3180 | 0.3249 | 0.3335 | 0.3636 | 0.3560 | 0.3064 |
| Eastern Region | 0.3383 | 0.3472 | 0.3691 | 0.3889 | 0.4023 | 0.4091 | 0.4177 | 0.4336 | 0.4707 | 0.4731 | 0.4050 |
| Shanxi | 0.2241 | 0.2058 | 0.2229 | 0.2420 | 0.2632 | 0.2815 | 0.3057 | 0.3362 | 0.3624 | 0.3928 | 0.2837 |
| Anhui | 0.2025 | 0.2151 | 0.2448 | 0.2659 | 0.2707 | 0.2889 | 0.3008 | 0.3214 | 0.3629 | 0.3779 | 0.2851 |
| Jiangxi | 0.1749 | 0.1790 | 0.2149 | 0.2169 | 0.2197 | 0.2393 | 0.2502 | 0.2834 | 0.3323 | 0.3521 | 0.2463 |
| Henan | 0.2357 | 0.2413 | 0.2658 | 0.2812 | 0.2790 | 0.3016 | 0.3085 | 0.3285 | 0.3619 | 0.3854 | 0.2989 |
| Hubei | 0.2147 | 0.2239 | 0.2382 | 0.2529 | 0.2670 | 0.2931 | 0.2963 | 0.3108 | 0.3417 | 0.3649 | 0.2803 |
| Hunan | 0.2172 | 0.2252 | 0.2416 | 0.2442 | 0.2660 | 0.2983 | 0.3057 | 0.3285 | 0.3673 | 0.3833 | 0.2877 |
| Central Region | 0.2115 | 0.2150 | 0.2380 | 0.2505 | 0.2609 | 0.2838 | 0.2945 | 0.3181 | 0.3548 | 0.3760 | 0.2803 |
| Inner Mongolia | 0.1447 | 0.1465 | 0.1827 | 0.2034 | 0.2137 | 0.2390 | 0.2550 | 0.2786 | 0.3221 | 0.3032 | 0.2289 |

Table 4. Cont.

| Region | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Average Value |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|
| Guangxi | 0.1874 | 0.1759 | 0.1868 | 0.2026 | 0.2143 | 0.2287 | 0.2327 | 0.2524 | 0.2949 | 0.3314 | 0.2307 |
| Chongqing | 0.2119 | 0.2336 | 0.2656 | 0.2909 | 0.3040 | 0.3286 | 0.3535 | 0.3713 | 0.4097 | 0.4361 | 0.3205 |
| Sichuan | 0.2178 | 0.2240 | 0.2487 | 0.2537 | 0.2589 | 0.2803 | 0.2984 | 0.3313 | 0.3425 | 0.3332 | 0.2789 |
| Guizhou | 0.1544 | 0.1595 | 0.1748 | 0.1962 | 0.2177 | 0.2479 | 0.2713 | 0.3252 | 0.3856 | 0.4297 | 0.2562 |
| Yunnan | 0.1965 | 0.2059 | 0.2234 | 0.2332 | 0.2525 | 0.2829 | 0.2966 | 0.3191 | 0.3547 | 0.3837 | 0.2748 |
| Tibet | 0.1796 | 0.1852 | 0.1893 | 0.2137 | 0.2201 | 0.2348 | 0.2492 | 0.2383 | 0.2612 | 0.2759 | 0.2247 |
| Shaanxi | 0.2191 | 0.2177 | 0.2240 | 0.2262 | 0.2435 | 0.2723 | 0.2858 | 0.3020 | 0.3286 | 0.3559 | 0.2675 |
| Gansu | 0.0965 | 0.1055 | 0.1208 | 0.1325 | 0.1541 | 0.1776 | 0.2001 | 0.2164 | 0.2478 | 0.2611 | 0.1712 |
| Qinghai | 0.1104 | 0.1054 | 0.1377 | 0.1433 | 0.1512 | 0.1740 | 0.1975 | 0.2039 | 0.2655 | 0.2783 | 0.1767 |
| Ningxia | 0.1213 | 0.1324 | 0.1465 | 0.1570 | 0.1811 | 0.2064 | 0.2190 | 0.2372 | 0.2644 | 0.2602 | 0.1925 |
| Xinjiang | 0.1707 | 0.1658 | 0.1963 | 0.2098 | 0.2077 | 0.2112 | 0.2462 | 0.2674 | 0.2960 | 0.2982 | 0.2269 |
| Western Region | 0.1675 | 0.1714 | 0.1914 | 0.2052 | 0.2182 | 0.2403 | 0.2588 | 0.2786 | 0.3144 | 0.3289 | 0.2375 |
| Liaoning | 0.2273 | 0.2303 | 0.2516 | 0.2597 | 0.2846 | 0.3074 | 0.3014 | 0.3323 | 0.3626 | 0.3729 | 0.2930 |
| Jilin | 0.1356 | 0.1493 | 0.1570 | 0.1686 | 0.1888 | 0.2079 | 0.2240 | 0.2463 | 0.2715 | 0.2957 | 0.2045 |
| Heilongjiang | 0.1438 | 0.1450 | 0.1585 | 0.1758 | 0.1843 | 0.1801 | 0.1971 | 0.2146 | 0.2340 | 0.2409 | 0.1874 |
| Northeastern Region | 0.1689 | 0.1748 | 0.1890 | 0.2014 | 0.2192 | 0.2318 | 0.2408 | 0.2644 | 0.2894 | 0.3032 | 0.2283 |
| China | 0.2313 | 0.2369 | 0.2575 | 0.2729 | 0.2860 | 0.3023 | 0.3152 | 0.3349 | 0.3702 | 0.3820 | 0.2989 |

It can be seen from Table 4 that the comprehensive level of sustainable tourismization in China has increased year-by-year. It rose from 0.2313 in 2009 to 0.3820 in 2018, with an average annual growth rate of 6%. The largest increase occurred in 2017. This result was mainly due to the following reasons. Owing to the acceleration of the supply-side structural reforms, the supply structure of the tourism industry has been continuously optimized. The tourism industry has integrated into the national strategic system and has become a strategic pillar of the national economy. At the same time, China has issued a series of favorable policies for tourism development. With the in-depth progress in building a moderately prosperous society in an all-around way, the incomes of urban and rural residents have steadily increased. With the upgrade and acceleration of the consumption structure, tourism consumption has rapidly increased, laying a good foundation for tourism development.

Second, certain differences in the sustainable tourismization index scores of various provinces were identified. The developed regions represented by Beijing, Shanghai, Tianjin, Jiangsu, and Zhejiang led the country in terms of tourismization index scores, reaching comparatively high levels of tourismization, while Inner Mongolia, Xinjiang, Tibet, Jilin, Ningxia, Heilongjiang, Qinghai, Gansu, and other underdeveloped provinces in the west and northeast of the country were found to be relatively backward in terms of their sustainable tourismization index scores, indicating low levels of tourismization.

Third, tourismization rankings were shown to have changed significantly. Except for the unchanged rankings of Beijing, Shanghai, and Tianjin, the rankings of provinces have changed to different degrees. In terms of the top and lowest rankings, provinces have changed slightly, for example, Guangdong and Zhejiang in the eastern region and Ningxia, Gansu, Xinjiang, and Qinghai in the western region. In the middle section of the ranking, the positions have changed significantly, for example, Shanxi, Sichuan, Henan, Anhui, and Shaanxi. The most evident changes have occurred in Guizhou and Chongqing in the western region. Specifically, between 2009 and 2018, a total of 12 provinces rose in the rankings. Of these, Guizhou, Chongqing, and Yunnan rose significantly, climbing 17, 10, and 8 spots respectively. The rankings of Anhui, Qinghai, Jiangsu, Jiangxi, Inner Mongolia, Jilin, Gansu, Hunan, Shanxi also rose to a certain extent. In 2018, the rankings of

Beijing, Shanghai, Tianjin, and Zhejiang remained as they were in 2009, while the rankings of other provinces declined. For example, the rankings of Hainan, Sichuan, and Shaanxi fell significantly. The reasons for these changes may include the following aspects: First, the level of regional economic development not only influences the supply and demand structure of regional tourism development, but also the realization of the tourismization effect. Second, the foundations of tourism development vary from province to province, and there are differences in the support of tourism development in each province. The eastern region is relatively balanced, but the central and western regions are relatively different. In particular, the implementation of the western development drive and the rise of central China have contributed to the growth of tourismization in the central and western regions. These factors have led to differences in the progress and effects of tourismization promotion, thereby affecting the ranking of provinces.

5.2. Temporal Evolution of Sustainable Provincial Tourismization Level in China

From a region-based perspective, China's economic regions were divided into four regions: east, central, west, and northeast. As shown in Figure 2, from 2009 to 2018, the sustainable tourismization level of the whole country and each of the four regions continuously improved, with average levels of 0.2989, 0.4050, 0.2803, 0.2375, and 0.2283, respectively. The sustainable tourismization level of the eastern region exceeded the national average, and its economic development level was the highest in China. Therefore, the eastern region was considered to represent the national sustainable tourismization promotion process. The sustainable tourismization level of the eastern region was followed by the central, western, and northeast regions respectively. The sustainable tourismization level of these latter areas was lower than the national average, so it is necessary to further promote sustainable tourismization in these three regions. As far as the average annual growth rate is concerned, the growth rate in the east was found to be slowing down, while the growth rate in the west was found to be increasing. By ranking the average annual growth rates of the four regions from high to low, we determined a sequence of west, northeast, central, and then east. In terms of location, although the absolute level of sustainable tourismization in the eastern region increased to a certain extent by the end of the study period, the increase in value was not evident due to the relatively high level at the beginning of the study period; However, the western, northeast, and central regions were generally at low levels at the beginning of the study, so compared with the eastern region, they had greater scope for relative and absolute improvements.

At the provincial level, the sustainable tourismization levels of 31 provinces (cities and districts) were quite different. As the ranking of the sustainable tourismization level of each province varied from year to year, the annual average sustainable tourismization level of each province from 2009 to 2018 was calculated, and a horizontal comparison was carried out. As shown in Figure 3, Beijing and Shanghai were far ahead of other provinces in terms of sustainable tourismization. The top ten places for sustainable tourismization were taken by Beijing, Shanghai, Tianjin, Jiangsu, Zhejiang, Shandong, Guangdong, Chongqing, Hainan, and Henan. Of these, eight provinces are from the eastern region, one is from the central region, and one is from the western region. The comprehensive scores of the sustainable tourismization level of the above ten provinces were all higher than the national average, while those of the other provinces were all lower than the national average.

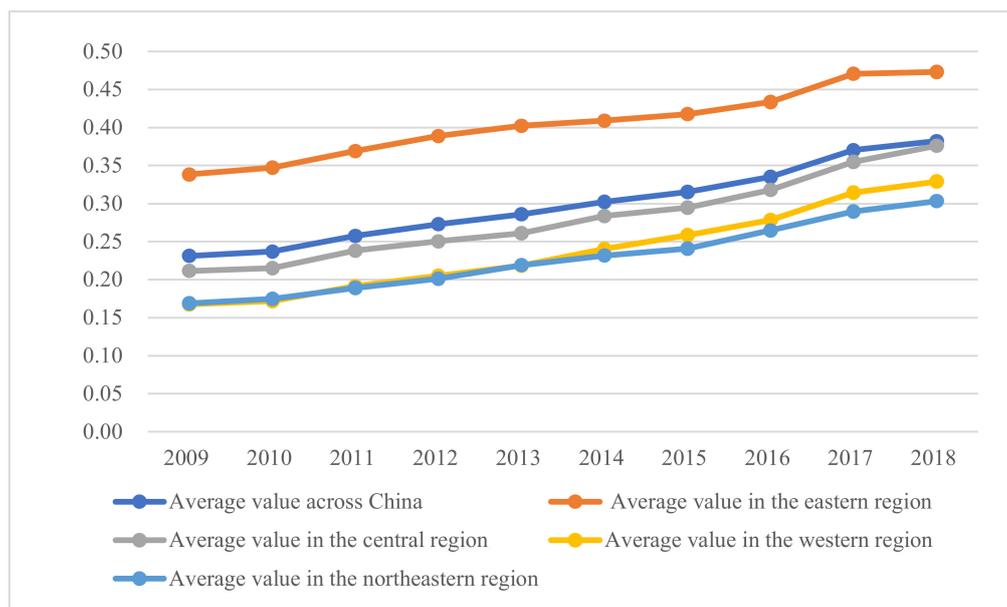


Figure 2. Provincial sustainable tourismization level in China from 2009 to 2018.

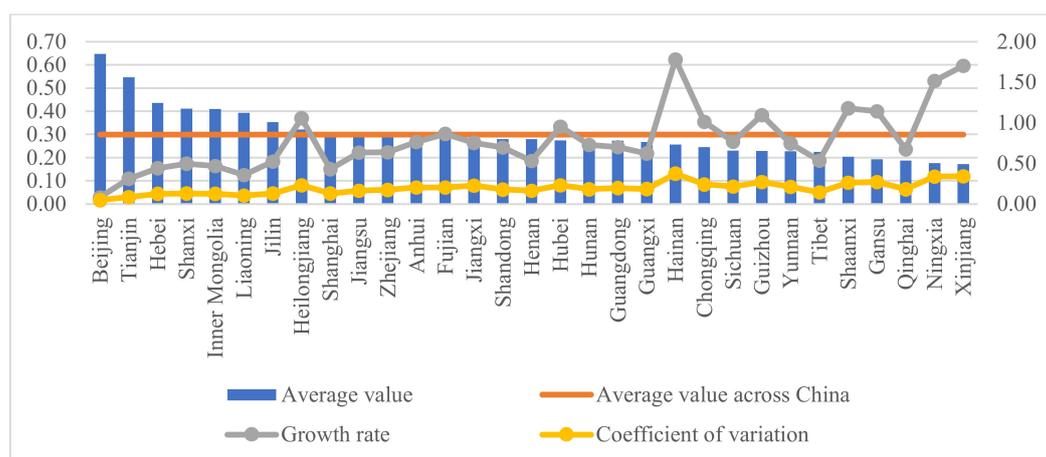


Figure 3. Levels and changes in sustainable tourismization in different provinces from 2009 to 2018.

From a longitudinal comparison point of view, the sustainable tourismization level of 31 provinces (cities and districts) showed an overall improvement trend from 2009 to 2018, with an average increase of approximately 0.65 times. Guizhou, Gansu, Qinghai, Jilin, Ningxia, and Inner Mongolia had the most significant improvements in sustainable tourismization, with increases of more than 1.1 times. This result reflects progress in sustainable tourismization. Meanwhile, the coefficient of variation, which reflects the degree of dispersion on the unit mean attributed to the observed values included in each index, was adopted to measure the interannual variation of the sustainable tourismization level in China: the greater the coefficient of variation, the greater the interannual variation degree, and vice versa. From the perspective of interannual changes, the change in the sustainable tourismization level in 31 provinces (cities and districts) was generally small, and the provinces with an interannual variation coefficient greater than 0.25 were Guizhou, Gansu, Qinghai, Ningxia, Inner Mongolia, and Jilin, indicating that the sustainable tourismization level in these provinces had increased greatly. The interannual coefficients of variation of the other 21 provinces (cities and districts) were all less than 0.25, indicating that the interannual variation in the sustainable tourismization level in these provinces (cities

and districts) was relatively low. The combination of the growth rate of the sustainable tourismization level and the coefficient of variation demonstrated rapid increases in the sustainable tourismization level in Guizhou, Gansu, Qinghai, Jilin, Ningxia, and Inner Mongolia.

5.3. Spatial Differences in Provincial Sustainable Tourismization Levels in China

5.3.1. Characteristics of Regional Differences

(1) Overall characteristics of differences in the sustainable tourismization level

In order to further reveal the spatial differences in the sustainable tourismization level between regions and within regions in China, this paper used the Theil index for a correlation analysis. The Theil index values of the sustainable tourismization level in China and the eastern, central, western, and northeastern regions from 2009 to 2018 were calculated using the Theil index formula (see Table 5). As shown in Figure 4, the overall Theil index value of China's sustainable tourismization level declined from 2009 to 2018, a decrease of 66.1% from 0.0891 in 2009 to 0.0302 in 2018. This result indicates that the overall difference in China's sustainable tourismization level has gradually shrunk over time.

Table 5. Theil Index for the provincial sustainable tourismization level and its contribution rate in China.

| Year | Overall Differences | Interregional Difference and Contribution Rate | Intraregional Difference and Contribution Rate | Difference and Contribution Rate in the Eastern Region | Difference and Contribution Rate in the Central Region | Difference and Contribution Rate in the Western Region | Difference and Contribution Rate in the Northeastern Region |
|------|---------------------|--|--|--|--|--|---|
| 2009 | 0.0891 | 0.0511 (57.33%) | 0.0380 (42.67%) | 0.0565 (29.90%) | 0.0042 (0.84%) | 0.0306 (9.64%) | 0.0288 (2.28%) |
| 2010 | 0.0876 | 0.0514 (58.68%) | 0.0362 (41.32%) | 0.0530 (28.61%) | 0.0042 (0.83%) | 0.0310 (9.91%) | 0.0241 (1.97%) |
| 2011 | 0.0759 | 0.0450 (59.37%) | 0.0308 (40.63%) | 0.0466 (28.38%) | 0.0023 (0.55%) | 0.0244 (9.25%) | 0.0262 (2.45%) |
| 2012 | 0.0711 | 0.0431 (60.60%) | 0.0280 (39.40%) | 0.0422 (27.28%) | 0.0032 (0.81%) | 0.0226 (9.27%) | 0.0203 (2.04%) |
| 2013 | 0.0663 | 0.0392 (59.01%) | 0.0272 (40.99%) | 0.0433 (29.65%) | 0.0028 (0.74%) | 0.0184 (8.21%) | 0.0214 (2.39%) |
| 2014 | 0.0528 | 0.0301 (57.01%) | 0.0227 (42.99%) | 0.0347 (28.70%) | 0.0028 (0.97%) | 0.0164 (9.55%) | 0.0269 (3.78%) |
| 2015 | 0.0461 | 0.0254 (55.18%) | 0.0206 (44.82%) | 0.0341 (31.67%) | 0.0025 (0.96%) | 0.0138 (9.54%) | 0.0165 (2.64%) |
| 2016 | 0.0408 | 0.0212 (51.85%) | 0.0196 (48.15%) | 0.0311 (31.83%) | 0.0015 (0.69%) | 0.0157 (12.39%) | 0.0173 (3.24%) |
| 2017 | 0.0353 | 0.0182 (51.62%) | 0.0171 (48.38%) | 0.0283 (32.88%) | 0.0007 (0.35%) | 0.0123 (11.49%) | 0.0171 (3.65%) |
| 2018 | 0.0302 | 0.0147 (48.66%) | 0.0155 (51.34%) | 0.0224 (29.59%) | 0.0007 (0.42%) | 0.0157 (17.28%) | 0.0159 (4.04%) |

(2) Spatial Decomposition of Differences in the Sustainable Tourismization Level

First, the decomposability of the Theil index was used to measure the sustainable tourismization level of the Theil index within and between the four regions, as shown in Figure 4. On the whole, the intraregional and inter-regional differences in China's sustainable tourismization level shrunk. Intraregional differences and inter-regional differences decreased from 0.038 and 0.0511 in 2009 to 0.0155 and 0.0147 in 2018, representing decreases of 59.2% and 71.3%, respectively. Thus, the decrease in inter-regional differences in the sustainable tourismization level was relatively large. This result indicates that with the advancement of China's sustainable tourismization process, the differences in sustainable tourismization levels among the eastern, central, western, and northeastern regions gradually narrowed.

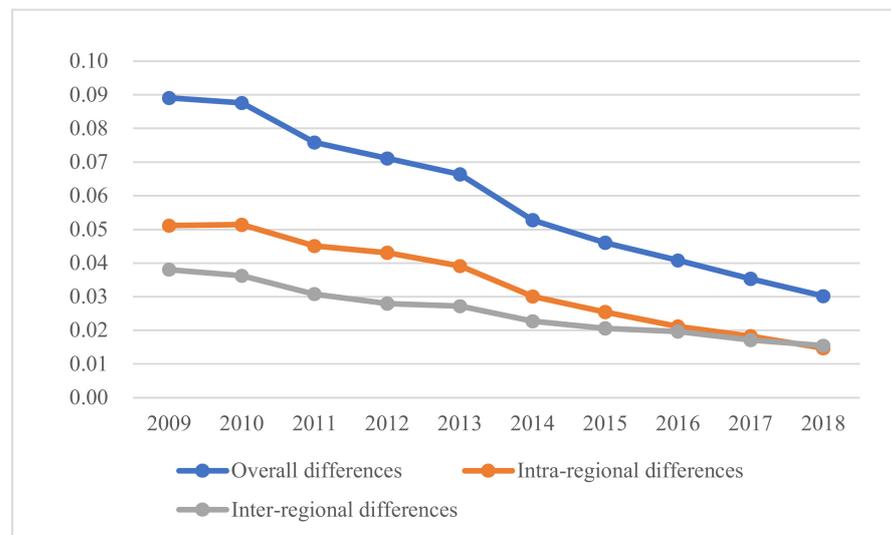


Figure 4. Decomposition of the Theil index of provincial sustainable tourismization levels in China from 2009 to 2018.

Second, the inter-regional differences among the four regions were analyzed, as shown in Figure 5. In the longitudinal comparison, the intraregional differences in the sustainable tourismization level in the four regions from 2009 to 2018 showed a trend of narrowing with fluctuations. This pattern was roughly consistent with the overall difference trend. The difference in the sustainable tourismization level in central China decreased the most, from 0.004 in 2009 to 0.001 in 2018, a decrease of 84.3%, followed by the eastern region with a decrease of 60.4%. The difference in sustainable tourismization decline between the western and northeastern regions was relatively small; the level declined by 48.9% and 44.8%, respectively, in these regions. In the horizontal comparison, the difference in the sustainable tourismization level was the largest in the eastern region from 2009 to 2018, followed by the western and northeastern regions, which showed similar changes, and then the central region. To summarise, although the differences in sustainable tourismization levels among the four regions gradually decreased, the level in the eastern region was always greater than that in other regions. This result indicates that the inter-provincial sustainable tourismization level in the eastern region was the most unbalanced.

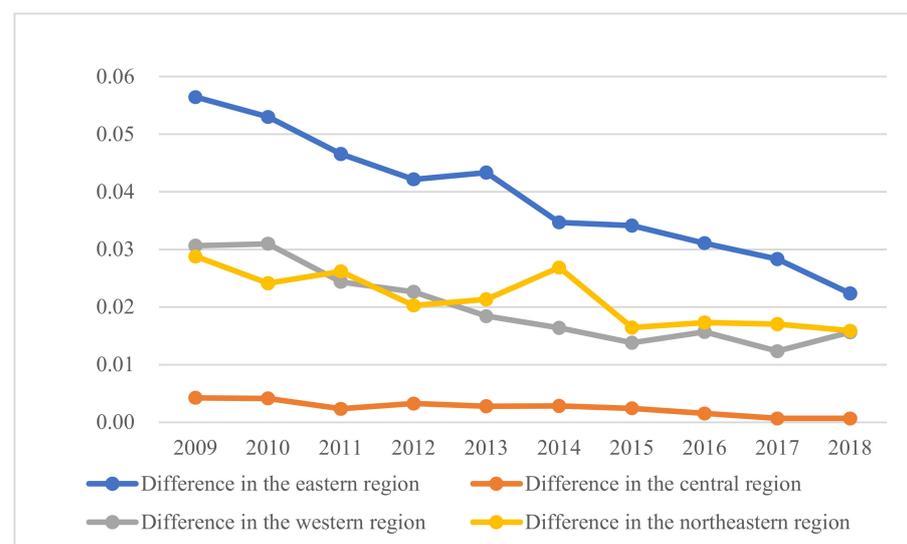


Figure 5. Theil Index of the sustainable tourismization level in the four major regions from 2009 to 2018.

Third, regarding the sources and contribution rates of regional differences, the contribution rate of inter-regional differences first increased and then decreased during the period from 2009 to 2018, with the highest contribution rate reaching 60.60% in 2012. However, the contribution rate of intraregional differences first decreased and then increased, with the lowest contribution rate being 39.40% in 2012. Throughout the study period, the contribution rate of inter-regional differences was higher than that of intra-regional differences, except for in the year 2018. It was found that the differences in the sustainable tourismization level among the eastern, central, western, and northeastern regions were the primary factor leading to imbalance in the sustainable tourismization level in China, but the influence was gradually weakening. When the contribution rates of inter-regional internal differences were compared among the four regions, it was found that the contribution of the difference in the sustainable tourismization level in the eastern region to the overall difference remained between 27.28% and 32.88% from 2009 to 2018, showing a slight fluctuation. The contribution of the difference in the sustainable tourismization level in the western region to the overall difference showed an overall upward trend. The northeast and central regions had contribution rates of less than 5%. Therefore, the contribution rates of differences in the sustainable tourismization level in the eastern and western regions to the overall differences in the sustainable tourismization level were far greater than those in the northeast and central regions. The interprovincial differences and contribution rate of the sustainable tourismization level in the eastern region were the largest, while the interprovincial differences and contribution rate of the sustainable tourismization level in the central region were the smallest. The interprovincial differences in the sustainable tourismization level in the eastern region were the main component of the overall difference in the sustainable tourismization level in China, followed by inter-regional differences in the western region, which gradually increased.

5.3.2. Characteristics of Spatial Correlation

In order to further explore the spatial correlation characteristics of the sustainable tourismization level in China's provinces, a spatial correlation analysis was carried out using the calculated comprehensive scores of the sustainable tourismization level.

(1) Global spatial autocorrelation analysis

As can be seen from Table 6, the global Moran's I values for each year were all positive. Using the results of a Z-statistic test at the significance level of 0.05, it was concluded that there was a positive spatial correlation for the sustainable tourismization level in China's provinces, which was manifested by the "high-high" (HH) or "low-low" (LL) spatial agglomeration effect. From the perspective of temporal variation, the Moran's I showed a fluctuating upward trend from 2009 to 2018, indicating that the degree of agglomeration gradually increased. Over time, the spatial agglomeration characteristics of regions with similar provincial sustainable tourismization levels gradually became apparent.

Table 6. Moran's I of the provincial sustainable tourismization level in China from 2009 to 2018.

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Moran'I | 0.2790 | 0.3007 | 0.3213 | 0.3169 | 0.3384 | 0.2913 | 0.3107 | 0.3205 | 0.3217 | 0.3052 |
| z Value | 2.0970 | 2.2319 | 2.3478 | 2.2965 | 2.4353 | 2.1025 | 2.2165 | 2.2696 | 2.2698 | 2.1445 |
| p Value | 0.0180 | 0.0150 | 0.0070 | 0.0100 | 0.0080 | 0.0210 | 0.0150 | 0.0130 | 0.0150 | 0.0230 |

(2) Local spatial autocorrelation analysis

Moran scatterplots and LISA cluster maps were drawn for 2009, 2012, 2015, and 2018 to analyze the agglomeration characteristics of the provincial sustainable tourismization level. Moran scatterplots were divided into four quadrants, which respectively represented four local spatial relationships between regional units and their neighbors (see Table 7 for the specific distribution).

Table 7. Table corresponding to Moran scatterplots of the provincial sustainable tourismization level in China from 2009 to 2018 (2009, 2012, 2015, and 2018).

| Year | Diffusion Effect Zone (HH) | Transition Zone (LH) | Low-speed Growth Zone (LL) | Polarization Effect Zone (HL) |
|------|--|--|--|--|
| 2009 | Beijing, Tianjin, Shanghai, Jiangsu, Zhejiang, Shandong, Liaoning, Hubei (8) | Hebei, Anhui, Jiangxi, Inner Mongolia, Guangxi (5) | Jilin, Heilongjiang, Guizhou, Yunnan, Tibet, Gansu, Qinghai, Ningxia, Xinjiang (9) | Fujian, Guangdong, Hainan, Shanxi, Henan, Hunan, Chongqing, Sichuan, Shaanxi (9) |
| 2012 | Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Shandong, Liaoning, Anhui, Henan, Hubei (11) | Inner Mongolia, Guangxi (2) | Shanxi, Jiangxi, Hunan, Jilin, Heilongjiang, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang (13) | Fujian, Guangdong, Hainan, Chongqing, Sichuan (5) |
| 2015 | Beijing, Tianjin, Shanghai, Jiangsu, Zhejiang, Shandong, Liaoning, Anhui, Henan, Hubei, Sichuan (11) | Hebei, Jiangxi, Inner Mongolia, Guangxi, Guizhou (5) | Jilin, Heilongjiang, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang (8) | Fujian, Guangdong, Hainan, Shanxi, Hunan, Chongqing, Yunnan (7) |
| 2018 | Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Shandong, Liaoning, Shanxi, Anhui, Jiangxi, Henan, Hubei, Hunan, Chongqing, Guizhou, Yunnan (17) | Inner Mongolia, Guangxi, Sichuan (3) | Jilin, Heilongjiang, Tibet, Gansu, Qinghai, Ningxia, Xinjiang (7) | Fujian, Guangdong, Hainan, Shaanxi (4) |

The diffusion effect zone (high-high agglomeration) indicated that the central province and neighboring provinces have relatively high sustainable tourismization levels, and the spatial correlation showed a diffusion effect. The diffusion effect zone is mainly concentrated in the eastern region, and in some central provinces, especially those in the eastern region where sustainable tourismization has a strong foundation, there is a spatial spillover effect and a trend of outward diffusion. Due to the promotion of the “all-for-one” tourism strategy in recent years, Chongqing, Guizhou, Yunnan, and other southwestern provinces have developed rapidly. The transition zone (low-high agglomeration) indicates that the level of sustainable tourismization in the central province is low, but the level of sustainable tourismization in the neighboring provinces is relatively high with a negative spatial correlation. The transition zone is mainly concentrated in the central and western provinces that have great development potential. The low-speed growth zone (low-low agglomeration) means that the sustainable tourismization level of the central province and neighboring provinces is relatively low with a low level of development in spatial correlation. The low-speed growth zone is mainly concentrated in the northeastern and western provinces. The polarization effect zone (high-low agglomeration) indicates that the level of sustainable tourismization in the central province is high. However, the level of sustainable tourismization in the neighboring provinces is relatively low, showing a high polarization effect in spatial correlation. Fujian, Guangdong, Hainan, and other coastal provinces are in the polarization effect zone, and their driving force needs to be further strengthened. On the whole, the sustainable tourismization level in China’s provinces presents a spatial pattern of “high in the east, followed by the central area, and relatively low in the west”. More than half of the provinces show positive spatial autocorrelation and locate in the diffusion effect zone and the low-speed growth zone. The sustainable tourismization level is characterized by agglomeration with neighboring areas, and spatial dependence is indicated by a high level of agglomeration, which shows that China’s sustainable tourismization process has made a certain amount of progress. Most of the provinces in the western region should pay attention to sustainable tourismization, as it can be a powerful driving force for the coordinated development of these regions, and it can help local governments to adjust the structural transformation mode, narrow the gap between urban and rural areas, and promote coordinated economic development and coordinated development of urban and rural areas. Therefore, the promotion of the sustainable tourismization process in these provinces is urgently needed to balance the sustainable tourismization level throughout the region.

As Moran scatterplots cannot determine the local correlation types of each region or whether there is statistical significance in the clustering region, it was necessary to use the LISA spatial agglomeration chart for further analysis. The results show that although the “low-low” (LL) agglomeration pattern failed the LISA significance test, the “high-high” (HH), “low-high” (LH) and “high-low” (HL) agglomeration patterns passed the LISA significance test. In the LISA cluster map, the “high-high” (HH) agglomeration areas in 2009 were identified as Tianjin and Shanghai; the “low-high” (LH) agglomeration areas were Hebei and Inner Mongolia; and the “high-low” (HL) agglomeration area was Guangdong. For 2012, the “high-high” (HH) agglomeration areas were identified as Tianjin, Hebei, and Shanghai; the “low-high” (LH) agglomeration area was Inner Mongolia, and the “high-low” (HL) agglomeration areas were Guangdong and Hainan. For 2015, the “high-high” (HH) agglomeration areas were Tianjin, Jiangsu, and Shanghai; the “low-high” (LH) agglomeration areas were Hebei and Inner Mongolia, and the “high-low” (HL) agglomeration areas were Guangdong and Hainan. For 2018, the “high-high” (HH) agglomeration areas were Tianjin, Hebei, Jiangsu, Shanghai, and Zhejiang; the “low-high” (LH) agglomeration area was Inner Mongolia, and the “high-low” (HL) agglomeration areas were Guangdong and Hainan. In the LISA cluster map of four years (Figure 6), the “high-high” (HH) agglomeration areas showed a contiguous state, and the agglomeration scope continued to expand over time. The “high-high” (HH) agglomeration areas mainly included Tianjin, Hebei, Jiangsu, Shanghai, Zhejiang, and other provinces in the eastern region, indicating that the eastern region has become the highland for the promotion of sustainable tourismization in China. The “low-high” (LH) agglomeration areas were isolated, with Inner Mongolia being a typical example, and the sustainable tourismization development level was lower than that of the surrounding provinces. Guangdong and Hainan were identified as typical “high-low” (HL) agglomeration areas. Guangdong Province was found to be leading the whole country in terms of socio-economic development with an advanced sustainable tourismization level that was significantly higher than that of other neighboring provinces. In recent years, Hainan Province has vigorously promoted the construction of an international tourism island, which has boosted its sustainable tourismization, making its overall sustainable tourismization process the best in China. In summary, the eastern coastal areas are contiguous areas with high levels of sustainable tourismization in China.

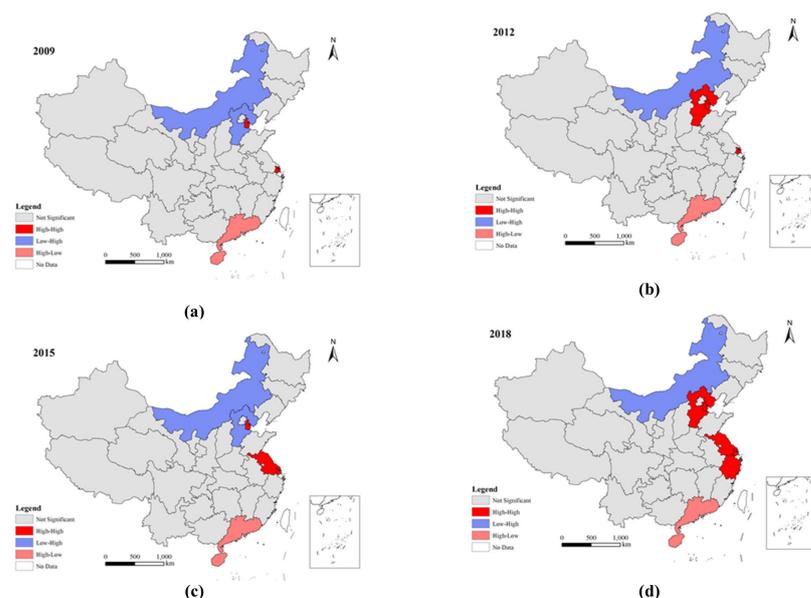


Figure 6. LISA cluster map of the provincial tourismization level in China for (a) 2009, (b) 2012, (c) 2015, and (d) 2018). Note: The figure is based on a standard map of the Standard Map Service System of the State Administration of Surveying, Mapping and Geographic Information (Examination No.: GS (2016) No.1579), and the base map has not been modified.

6. Conclusions and Suggestions

6.1. Conclusions

Starting from the connotations of sustainable tourismization, this study explored the three dimensions of consumption tourismization, spatial tourismization, and industrial tourismization to construct a comprehensive evaluation index system of sustainable tourismization. The constructed system reflects qualitative and quantitative development levels. Based on provincial panel data from 2009 to 2018, this study analyzed the spatial-temporal differences and dynamic evolution characteristics of the provincial sustainable tourismization level in China as well as conducting a comprehensive evaluation of the provincial sustainable tourismization level. Our results enrich and improve the current theoretical evaluation system for sustainable tourismization and can act as a reference for the promotion of sustainable tourismization. The following conclusions were drawn: (1) The level of sustainable tourismization in east, central, west, and northeast China and the overall sustainable tourismization level of the whole county is gradually improving. The eastern region was the pioneer area for the promotion of sustainable tourismization in China, but its growth rate is gradually slowing. The level of sustainable tourismization in the western region has increased rapidly, and the process of sustainable tourismization has achieved some success. (2) The difference in the sustainable tourismization level among provinces in China showed a downward trend year-by-year, and fluctuations in the four major regions shrunk year-by-year. The eastern region showed the most change, and the central region showed the least change. The main factors resulting in the uneven development of sustainable tourismization in China were inter-regional differences, internal differences in the eastern region, and internal differences in the western region. These were sequenced according to their contribution rates. With time, the contribution rate of inter-regional differences gradually declined, and the contribution rate of internal differences in the western region continuously increased. (3) In terms of the global spatial relationship, there was a positive spatial correlation at the level of sustainable tourismization for China's provinces. On the whole, the global Moran's I showed an increasing trend amongst fluctuations, and the spatial agglomeration effect gradually intensified. Regarding the local spatial relationship, provinces with high or low levels of sustainable tourismization tended to have evident spatial agglomeration characteristics, and spatial dependence was mainly manifested as "high-high" (HH) agglomeration, showing the ladder difference of "high in the east and low in the west".

Based on the findings of this study, it can be seen that the level of sustainable tourismization is the result of all dimensions. Although China has made some progress in promoting sustainable tourismization, unbalanced and insufficient development is still prominent. Therefore, China should adopt policies targeting encouragement and support to promote the development of the sustainable tourismization process in different regions, to enhance the regional sustainable tourismization process and the gradual formation of a development pattern that features complementary advantages and coordinated development among the eastern, central, western, and northeastern regions. Further discussion on regional differences is as follows:

The eastern region has the greatest level of tourismization, which is represented by the development of the consumption, industry, and spatial dimensions. In terms of consumption, this region has a higher level of tourism consumption due to its better economic development foundation and the diversified consumption patterns and structures of residents. In terms of space, this region has a relatively rich infrastructure and a high conversion rate for various resources, so it can provide tourists with more adequate service facilities and infrastructure. In terms of industry, the booming tertiary industry provides a good foundation for the development of the tourism industry. At the same time, the level of integration between tourism and other industries is higher, and the radiating effect of tourism is evident. Therefore, the role of the eastern region as a "hot spot" should be strengthened to promote the development of tourismization in other regions. The eastern region, especially the eastern coastal areas, should further enhance

its sustainable tourismization, continue to give full play to the advantages of regional tourism-related industry agglomeration and the integration of various industries, innovate the forms of tourism products and services, cultivate new forms of tourism consumption, foster diversified business models, improve the tourism destination space system, create a “livable, industry-friendly, and tourism-friendly” living and production space, and form a key pillar of growth in China’s sustainable tourismization process. Each region needs to break through administrative boundaries; strengthen the integration and flow of resources between regions; give full play to the demonstration and spillover effects of agglomeration and linkages between regions, such as Shanghai, Jiangsu, and Zhejiang; and transfer talent, technology, capital, and experience to the central and western regions to effectively drive regional tourism consumption, expand the sharing space between residents and visitors, promote the high-quality development of relevant industries, further narrow the inter-regional gap in the sustainable tourismization level, and stimulate the emergence of a new pattern of sustainable tourismization.

In contrast, the central and western regions, especially the western region, have relatively weak foundations for tourism development. Although the level of tourismization continues to improve, it is evident that there are still many problems, including the consumption level, reception environment, reception level, sustainable use of resources, tourism industry structure, and tourism factor flow, among other aspects. Some problems have received little attention and need to be considered by the government. These regions still have significant room for improvement in the consumption, space, and industries involved in tourism development in the future. The central and western regions should strengthen the concept of innovation, conduct strategic adjustments; model tourism development innovations; promote the integrated development of various traditional and non-traditional tourism resources; enhance integration with other industries; increase tourism consumption; push forward the integration of regional tourism resources, capital, and human resources; and increase the development efficiency of the tourism industry. In addition, it is necessary to enhance the ability to accept spillover effects in the eastern region and actively learn from development models and advanced experiences of areas with high levels of sustainable tourismization, e.g., those in the eastern region, in combination with features of their actual situation to establish a sustainable tourismization model and pathway that is in line with the actual conditions in these regions. The creation of featured sustainable tourismization development areas is also recommended to drive the surrounding areas to promote sustainable tourismization through typical demonstrations. In the western region especially, the state should provide policy support, protect tourism resources, realize the economic benefits of ecological resources, actively expand the tourism consumption space, and upgrade tourism consumption. Moreover, it is of great significance for the state to take the sustainable tourismization process into account when attempting to improve the social public service mode, improve public service quality, innovate the public service system, encourage regional cooperation across regions, and reduce intraregional differences in the sustainable tourismization level to effectively promote local social and economic development through the process of sustainable tourismization.

6.2. Strategic Suggestions

In order to improve the tourismization level and mitigate regional differences, the following strategic suggestions are put forward:

- (1) Tourist consumption upgrading should be intensified to promote the effective transformation of travel demand. All people involved in tourism, whether destination managers or tourism operators, should adhere to a people-centered approach to create a good environment for consumption and services that reflects the actual needs and vital interests of tourists. High-quality products and services should be offered to customers to fully satisfy diverse consumer demands in areas such as tourism, leisure, and so on. In addition, the consumption space in urban and rural areas should be expanded, with new areas of high consumer demand fostered, and upgrades

of tourism and leisure consumption promoted. A significant amount of attention should be paid to the improvement of innovation and creativity. It is a good way to enhance the innovative development and utilization of tourism and leisure resources, especially traditional tourism resources, and promote the creative design of products. Tourists are attracted to cultural creativity, and touring and shopping experiences can be enhanced by making full use of scientific and technological means, continuously satisfying tourists' needs for leisure, vacation, and cultural experiences. What is more, it is essential to realize tourism rights through institutional supply. More attention should be paid to the touring and leisure rights of vulnerable groups and other special groups. Governments should take an active approach to the building of systems and policies related to the flow of visitors, including public vacation systems, social welfare systems, and entry-exit facilitation policies. By doing so, the degree of tourism facilitation will be advanced, enhancing the mobility of tourism.

- (2) Efforts should be made to build a destination space system and create shared spaces between hosts and guests. First, local governments should be active in constructing different tourist function areas, including scenic routes, scenic spots, resorts, leisure blocks, tourist blocks, tourism complexes, national parks, tourism towns, characteristic villages, and tourism cities. Destination space system gathering points, lines, and areas should form the main skeleton, with the tourism and leisure spaces in cities and villages continuously expanding. At the same time, each region needs to break through administrative boundaries, strengthen the integration and flow of resource elements between regions, and promote the coordinated development of the regional tourism industry. Additionally, the convergence and integration of multiple plans should be promoted, and tourism development plans should be incorporated into local economic and social development plans and other parallel programs, such as those associated with territorial and spatial planning. In particular, when it comes to the planning of urban and rural infrastructure, public service facilities, and social welfare, it is necessary to consider the needs of tourists. Furthermore, the construction of tourism demonstration zones; tourist resorts; cultural and tourism industry integration demonstration zones; tourism and leisure cities and neighborhoods; and the building of civilized cities, sanitary cities, sponge cities, and beautiful villages, as well as their parallel development and coordination, should be promoted. The concept of "integration and sharing" should be advocated to build a production and living space shared by hosts and guests.
- (3) A composite industrial structure ought to be built to facilitate the integrated development of high-quality industries. The first step is to boost the merging of tourism and other industries—primary, secondary, and tertiary. A diversified and compound industrial structure based on tourism consumption should be constructed to extend the entire industry chain, expanding space for further development of tourism consumption. By combining tourism consumption with agriculture, industry, culture, sports, health, education, and many other fields, the integrated advantages of tourism are fully addressed, enhancing the added value of these existing industries and optimizing the integration and efficient allocation of existing resources. In terms of business innovation and product system creation, the second step is to meet the real travel needs of various consumer groups in the new era and to tap into potential needs through observing the lifestyle and contemporary culture of a destination. The creation of tourism products and cultivation of the form of tourism in areas including leisure and vacation tourism, rural tourism, industrial tourism, sports tourism, medical tourism, health-preserving tourism, and study travel are significant factors. The destination should play a positive role in exploring and developing night-time leisure products related to cultural tourism to boost the vitality of local economic development in the night-time.
- (4) A social service system should be built to promote social governance innovation. The first is to transition from social management to social governance and build a dual-

core social governance system centered on settlers and tourists. The top-level design of social governance should be reinforced. Concretely speaking, tourism development concepts should be integrated into the overall economic and social development and the construction of a comprehensive governance system and public service system covering destination cities, villages, and communities. This recommendation is beneficial as it may expand the function of regional tourism. In particular, it is time to establish a service-oriented government that aims to continuously improve the functions of social management and public services. The quality of public services should be improved to form a joint force between social management and public services to carry out management in services and reflect services in management. In addition, the government need to compensate for shortcomings in public service quality by improving social public service methods. Public service systems such as public information services, public service facilities, public safety guarantee systems, individual passenger service systems, and public welfare products should be innovated and upgraded. The integration of tourism infrastructure and public service facilities should actively promote the equalization and convenience of public services.

6.3. Limitations and Future Research

This study analyzed the connotations and significance of sustainable tourismization. A comprehensive evaluation index system of sustainable tourismization for the evaluation and analysis of the level of sustainable tourismization in various regions from the macro level was proposed. This study lays a theoretical foundation for the study of tourismization and provides a decision-making basis and practical guidance for the development of regional sustainable tourismization. However, due to the availability of data and statistical caliber issues, the index we designed did not include indicators related to the tourismization of regional resources, such as cultural tourismization. We expect to carry out further analysis on this kind of indicator. Meanwhile, due to the limitations of the research objects and research scale, this study evaluated the tourismization level and analyzed its temporal and spatial characteristics from the provincial level only. Future research should focus on the municipal and county levels to identify the characteristics and development of tourismization in China in a more comprehensive manner. Moreover, the comprehensive evaluation index system could be applied to other countries or regions to evaluate the sustainable tourismization level, test the universality of the index system, and provide a basis for public decision-making.

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