Spatiotemporal Evolution Characteristics and Influencing Factors of Provincial Tourism Efficiency in China: Postprint

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Abstract

The problem of unbalanced and insufficient development of China's tourism industry remains prominent. Clarifying the spatiotemporal evolution characteristics of tourism efficiency and their driving forces is of great significance for improving tourism efficiency and promoting high-quality development of regional tourism. Based on the Data Envelopment Analysis model, this study evaluated the tourism development efficiency of 31 provincial-level regions (excluding Hong Kong, Macao, and Taiwan) from 2009 to 2019, and analyzed the spatiotemporal evolution characteristics and influencing factors of tourism efficiency at the provincial level in China using spatial autocorrelation, cold-hot spot analysis, and regression models. The results show that: (1) From 2009 to 2019, China's tourism efficiency demonstrated a steady upward trend overall, with significant spatial distribution differences in various efficiency levels, gradually strengthening spatial agglomeration characteristics, and the tourism growth mode transitioning from extensive to intensive development. (2) Significant positive spatial correlation exists in the tourism development efficiency of China's provincial-level regions, with the average comprehensive efficiency, average pure technical efficiency, and average scale efficiency of tourism development efficiency presenting a spatial pattern of "hot in the south, cold in the north" locally. (3) Tourism resource quality exerts the strongest positive driving effect on comprehensive efficiency of tourism, transportation accessibility primarily positively influences pure technical efficiency, while tourism development quality constitutes the main positive influencing factor of scale efficiency. (4) Enriching tourism product forms, improving regional tourism cooperation mechanisms, and optimizing tourism industrial structure represent important pathways to enhance the tourism development efficiency of China's provincial-level regions. The research results can provide theoretical basis and practical paradigms for formulating regional tourism coordinated development strategies and achieving high-quality development of the tourism industry.

Full Text

Preamble

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Spatiotemporal Evolution Characteristics and Influencing Factors of Provincial Tourism Efficiency in China

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Abstract: The issue of imbalanced and insufficient development in China's tourism industry remains prominent. Clarifying the spatiotemporal evolution characteristics and driving forces of tourism efficiency is crucial for enhancing efficiency and promoting the high-quality development of regional tourism. Using the data envelopment analysis model, this study assesses the tourism development efficiency of 31 provinces (excluding Hong Kong, Macao, and Taiwan regions) from 2009 to 2019. It employs spatial autocorrelation, cold and hot spot analysis, and regression models to analyze the spatiotemporal evolution characteristics and factors influencing China's provincial unit tourism efficiency. The research reveals the following: (1) Between 2009 and 2019, China's tourism industry efficiency exhibited a steady upward trend. Significant differences in the spatial distribution of various efficiency levels were observed, with strengthening spatial agglomeration characteristics. The tourism growth mode is transitioning from extensive to intensive development. (2) There is a notable spatial positive correlation in the development efficiency of China's provincial tourism industry. The average comprehensive efficiency, average pure technical efficiency, and average scale efficiency of tourism industry development exhibit a spatial pattern of "hot in the south and cold in the north" at the local level. (3) The comprehensive efficiency of the tourism industry is strongly influenced by the quality of tourism resources. Pure technical efficiency is primarily affected by the positive impact of transportation accessibility, while the quality of tourism development is the main positive impact factor of scale efficiency. (4) Enriching tourism product formats, improving regional tourism cooperation mechanisms, and optimizing the tourism industry structure emerge as crucial strategies for enhancing the development efficiency of China's provincial tourism industry. The research findings provide a theoretical basis and practical paradigm for formulating regional tourism collaborative development strategies and achieving the high-quality development of the tourism industry.

Key words: tourism efficiency; data envelopment analysis; spatial differentiation; influencing factors; provincial scale; China

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Introduction

As an environmentally friendly and resource-efficient comprehensive industry, tourism is widely recognized as a "golden industry" and a "sunrise industry." In 2018, the "Guiding Opinions of the General Office of the State Council on Promoting the Development of All-for-One Tourism" stated that "tourism is an important industry for improving economic levels, enhancing employment conditions, and meeting the people's growing needs for a better life," emphasizing tourism's strategic position as a pillar industry of the national economy. Tourism efficiency represents the input-output ratio of tourism economic activities and is used to measure the maximum value that tourism stakeholders can obtain by utilizing all resources. Therefore, studying the allocation efficiency of tourism elements and its spatiotemporal evolution helps clarify the utilization and transformation efficiency of tourism elements in various provincial regions, thereby promoting the transformation and upgrading of the tourism industry while laying a research foundation for academics to deepen the measurement and enhancement of tourism efficiency.

Research on tourism efficiency has long been a focus for scholars both domestically and internationally. International research on tourism efficiency began in the early 1990s, while domestic scholars started paying attention to tourism development efficiency in the early 21st century. In terms of research content, scholars have focused on hotel operational efficiency, tourism poverty alleviation efficiency, tourism industry efficiency, and tourism eco-efficiency. Regarding research methods, these mainly include parametric methods represented by stochastic frontier analysis and non-parametric methods represented by data envelopment analysis (DEA) models. From a research perspective, studies have covered macro-level urban agglomerations, meso-level provinces and cities, and micro-level tourism villages and scenic spots, examining both spatial and spatiotemporal dimensions. In summary, existing research has enriched the field of tourism efficiency and laid a theoretical and technical foundation for subsequent studies. However, current research still lacks in-depth analysis of the influencing mechanisms of tourism efficiency based on its measurement, particularly regarding the analysis of pure technical efficiency and scale efficiency as components of comprehensive efficiency. Moreover, most existing studies have neglected the exploration of spatial effects on the spatiotemporal evolution and influencing mechanisms of tourism efficiency.

Based on this, this study selects panel data of tourism development from 31 provincial-level regions (excluding Hong Kong, Macao, and Taiwan) from 2009 to 2019, uses the DEA model to measure and comprehensively evaluate provincial tourism development efficiency, and decomposes it into pure technical efficiency and scale efficiency. Since spatial effects influence tourism development efficiency, this study employs spatial statistics and spatial econometric methods to investigate the spatial pattern evolution characteristics and influencing factors of regional tourism development efficiency, with the aim of improving the rationality of tourism industry factor allocation, accelerating the transforma-

tion, upgrading, and quality improvement of the tourism industry, and providing a theoretical basis and practical paradigm for formulating regional tourism collaborative development strategies and achieving high-quality tourism development.

1. Data and Methods

1.1 Data Sources

Data for 2009-2019 on tourism employees, tourism fixed asset investment, tourism reception volume, tourism revenue, travel agency numbers, and tourism resource endowment for each province were obtained from the *China Tourism Statistical Yearbook*, provincial statistical yearbooks, and lists of tourist attractions for each year.

1.2 Indicator Selection

1.2.1 Tourism Development Efficiency Tourism development efficiency refers to the output under constant production factor inputs—the higher the output, the higher the efficiency, and vice versa. Tourism development efficiency consists of two major indicators: inputs and outputs. Considering the development characteristics of the tourism industry and the specificity of individual data, this study constructs an evaluation index system for provincial tourism development efficiency based on previous research findings .

Input Indicators. Capital, land, and labor are the most basic production factors. Since land has minimal impact on tourism development, land factors were removed from the input indicators. For capital factor input indicators, this study selected the total urban fixed asset investment in accommodation, catering, and cultural entertainment industries, the number of star-rated hotels, and the number of travel agencies to measure capital elements. Tourism resources constitute the core competitive advantage of tourist destinations, so tourism resource endowment was used to measure capital factor input. The entropy method was applied to calculate the weights of A-level and above tourist attractions, national scenic spots, national geological parks, national forest parks, national wetland parks, intangible cultural heritage items, and excellent tourism cities, with the weighted sum yielding tourism resource endowment. For labor factor input indicators, the total number of employees in tourism enterprises was used to measure labor input.

Output Indicators. Output indicators measure the results of tourism production and operation over a period. Under the premise of ensuring data authenticity and effectiveness, tourism output indicators consist of total tourism revenue (the sum of domestic and international tourism revenue) and tourism reception volume (the sum of domestic and international tourism reception volume).

1.2.2 Influencing Factors of Tourism Development Efficiency To investigate the influencing factors of China's provincial tourism development efficiency, this study uses the tourism development efficiency measured by the DEA model as the dependent variable and conducts panel ordinary least squares (OLS) regression analysis. Drawing on existing research findings, four factors were selected as independent variables: regional economic development level, tourism resource quality, tourism development quality, and transportation accessibility.

Regional Economic Development Level. Gross Domestic Product (GDP) is an important comprehensive statistical indicator in the accounting system, reflecting a country's (or region's) economic strength and market size. As an objectively existing economic quantification indicator, it measures a region's economic development level. Higher economic development levels correspond to higher tourism development efficiency. Therefore, per capita GDP was used to measure the region's economic development level.

Tourism Resource Quality. Tourism resources are objective factors that stimulate people's travel impulses, possess natural and historical-cultural characteristics, and can bring economic, social, and environmental benefits to destinations. Tourism resources play an important role in tourism factor input and benefit transformation. The proportion of A-level and above scenic spots among all scenic spots was used to measure regional tourism resource quality.

Tourism Development Quality. Tourism development quality refers to the level and capability demonstrated during tourism development and is an important indicator for measuring a region's tourism development speed and industrial competitiveness. Tourism reception volume and tourism revenue represent the development level of the tourism industry. Therefore, the reception volume and total revenue of all tourism business institutions were used as proxy variables for tourism development quality.

Transportation Accessibility. A region's transportation accessibility is a prerequisite for tourist travel and directly affects the accessibility of tourism activities. Tourist destinations with convenient transportation conditions can attract more tourists, facilitate the flow of talent and capital, introduce advanced digital technology and management experience, optimize resource allocation and utilization, and increase local tourism benefits. Improving transportation accessibility and accessibility is significant for enhancing tourism efficiency. Therefore, passenger volume in each province was selected as a proxy variable for transportation accessibility.

1.3 Methods

1.3.1 Data Envelopment Analysis (DEA) Model The DEA model, proposed by American scholars Charnes, Cooper, and Rhodes, is an econometric method for evaluating the efficiency of decision-making units under multiple inputs and outputs. Generally, DEA models can be divided into input-oriented

models (minimizing inputs under constant output levels) and output-oriented models (maximizing outputs under constant input levels). Compared to controlling tourism industry element outputs, tourism industry element inputs are more controllable. Therefore, this study adopts the input-oriented DEA model to measure tourism industry efficiency and further decomposes comprehensive efficiency into pure technical efficiency and scale efficiency. Pure technical efficiency primarily reflects a provincial region's resource allocation and transformation level during a certain period, while scale efficiency mainly measures the degree of fit between tourism resource factor inputs and tourism development demands. Comprehensive efficiency is the overall reflection of pure technical efficiency and scale efficiency and comprehensively measures the resource allocation status and factor input levels across regions. This study uses the DEA model to analyze and measure the tourism development efficiency of 31 provinces nationwide. The calculation formula is as follows:

$$\begin{aligned} \min \quad & \theta \\ \text{s.t.} \quad & \sum_{j=1}^{n} \lambda_j x_j \leq \theta x \\ & \sum_{j=1}^{n} \lambda_j y_j \geq y \\ & \lambda_j \geq 0, \quad j = 1, 2, \ldots, n \end{aligned}$$

where θ ($0 \leq \ \leq 1$) represents the comprehensive efficiency level of each provincial region annually. The closer is to 1, the higher the comprehensive efficiency of the province's tourism industry. When $= 1$, the input-output ratio efficiency is at its optimum, indicating the best state. n is the number of provincial units; x_j is the tourism development efficiency input of the jth provincial unit; y_j is the tourism development efficiency output of the jth provincial unit; x and y are the initial input and output values of each province's tourism efficiency, respectively; and λ_j is the weight of input-output indicators.

1.3.2 Global Spatial Autocorrelation Global spatial autocorrelation is commonly used to measure the spatial dependence degree of a variable in the study area. This study uses Moran's I index for measurement, with the calculation formula as follows:

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

where n is the number of provincial units; $\bar{x}$ is the mean of observed values; x_i and x_j are observed values at spatial locations i and j, respectively; w_{ij} is the spatial proximity weight matrix; and S^2 is the sample variance.

Moran's I values range from -1 to 1. When Moran's I > 0, positive spatial autocorrelation exists, with larger values indicating stronger spatial correlation among provincial regional tourism efficiencies. When Moran's I < 0, negative spatial autocorrelation exists, with smaller values indicating higher spatial heterogeneity. When Moran's I = 0, no spatial effects exist among regions.

The Z-value is used for statistical testing of Moran's I results, calculated as follows:

$$Z(I) = \frac{I - E(I)}{\sqrt{\mathrm{Var}(I)}}$$

where $E(I)$ is the expected value and $\mathrm{Var}(I)$ is the variance.

1.3.3 Local Spatial Autocorrelation Local spatial autocorrelation tests can examine the spatial agglomeration degree within each region, identify anomalies in spatial locations, and discover differences among data. To better determine the provincial unit locations of similar or dissimilar agglomeration phenomena, the Getis-Ord G_i statistic is used to analyze the spatial patterns of tourism development efficiency and the spatial correlation degree among study regions. The calculation formula is as follows:

$$G_i(d) = \frac{\sum_{j=1}^{n} w_{ij}(d)x_j}{\sum_{j=1}^{n} x_j}$$

where x_j is the observed value at spatial location j; d is the distance between spatial elements; and $w_{ij}(d)$ is the distance weight between points i and j.

Standardizing $G_i(d)$ yields:

$$Z[G_i(d)] = \frac{G_i(d) - E[G_i(d)]}{\sqrt{\mathrm{Var}[G_i(d)]}}$$

where $E[G_i(d)]$ and $\mathrm{Var}[G_i(d)]$ are the expectation and variance of $G_i(d)$, respectively. If $Z[G_i(d)]$ is positive and passes the significance test, it indicates that values near unit i exceed the average level, showing high-value spatial agglomeration (hot spot areas). If $Z[G_i(d)]$ is negative and passes the significance test, it indicates that values near unit i are below the average level, showing low-value spatial agglomeration (cold spot areas).

2. Results and Analysis

2.1 Spatiotemporal Evolution Characteristics of Tourism Efficiency

Using the natural breaks method, the tourism efficiency measurement results were divided into five levels: low (0.30–0.45), relatively low (0.45–0.60), medium

(0.60–0.71), relatively high (0.71–0.87), and high (0.87–1.00). The spatial evolution of tourism efficiency from 2009 to 2019 was further analyzed to examine the spatial patterns of the three efficiency types [Figure 1: see original paper], [Figure 2: see original paper], [Figure 3: see original paper].

2.1.1 Comprehensive Efficiency Analysis According to the spatial distribution of provincial tourism comprehensive efficiency in China from 2009 to 2019 [Figure 1: see original paper], the average comprehensive efficiency of provincial tourism industry during the past 11 years was 0.684, reaching 68.4% of the ideal state and indicating a medium efficiency level. However, significant differences in tourism industry input-output among provinces remain evident, with most provincial regions still at medium, relatively low, and low levels, particularly in economically underdeveloped western regions. To explore provincial differences in depth, the average tourism comprehensive efficiency of eastern, central, and western provinces was measured, yielding results of 0.712, 0.753, and 0.605, respectively. This shows that central provinces have the highest comprehensive efficiency, with eastern and central provinces exceeding the national average. Xia Zancai et al. measured average tourism efficiency values for China's eastern, central, and western regions from 2005 to 2015, indicating that central region tourism comprehensive efficiency levels significantly exceed those of eastern and western regions.

2.1.2 Pure Technical Efficiency Analysis The average pure technical efficiency of China's provincial tourism industry from 2009 to 2019 was 0.787, reaching 78.7% of the ideal state, with an overall upward trend during the study period. In terms of spatial distribution, high pure technical efficiency areas in 2009 were mainly concentrated in northeastern, southwestern, and eastern coastal provinces, while low-value areas were primarily in northern provinces such as Inner Mongolia, Gansu, and Hebei [Figure 2: see original paper]. By 2014, high-value areas expanded rapidly, mainly gathering in provinces from southwest to southeast, while low-value areas were located in Jilin and Guangxi [Figure 2: see original paper]. In 2019, high-value areas decreased somewhat, mainly distributed in southwestern, central, and southeastern coastal provinces, while low-value areas were mainly in Inner Mongolia, Heilongjiang, and Shandong [Figure 2: see original paper].

Comparing [Figure 1: see original paper] and [Figure 2: see original paper], the changing trends of tourism comprehensive efficiency and pure technical efficiency are broadly consistent, indicating that provincial tourism comprehensive efficiency changes with pure technical efficiency—that is, provincial tourism comprehensive efficiency increases with higher pure technical efficiency and decreases with lower pure technical efficiency. Therefore, provinces with low tourism efficiency should increase investment in tourism technology, introduce compound professional talent, and strengthen the promotion of advanced tourism technologies to improve tourism development efficiency.

2.1.3 Scale Efficiency Analysis The spatial distribution of China's provincial tourism scale efficiency from 2009 to 2019 [Figure 3: see original paper] shows that the average scale efficiency of provincial tourism during the past 11 years was 0.869, reaching 86.9% of the ideal state. In 2009, high scale efficiency areas were mainly distributed in northern, central, and southern provinces, while low-value areas were in Xinjiang and Hainan [Figure 3: see original paper]. By 2014, high-value areas were concentrated in northern, northwestern eastern, and middle-lower Yangtze River provinces, while low-value areas remained in Hainan [Figure 3: see original paper]. In 2019, high-value areas were mainly distributed in northern, central, and southwestern regions, while low-value areas appeared in Ningxia, Qinghai, and Tibet [Figure 3: see original paper]. Overall, provincial tourism scale efficiency presents a pattern of high values in eastern and central regions and low values in western regions. China's current tourism development resource factor inputs generally fail to meet tourism demand, remaining in the initial stage of gradually increasing scale benefits with considerable room for improvement. Reasonable input strategies should be adopted to obtain greater benefits.

2.2 Spatial Correlation Analysis of Tourism Efficiency

2.2.1 Global Spatial Correlation To further explore the spatial agglomeration characteristics of tourism efficiency, global Moran's I index was used to measure the spatial correlation of provincial tourism efficiency in China in 2009, 2014, and 2019 . The results show that the global Moran's I values for tourism comprehensive efficiency, pure technical efficiency, and scale efficiency were all significantly positive and showed a fluctuating upward trend. This indicates that tourism development efficiency exhibits overall positive spatial correlation—the higher the tourism efficiency in a province, the higher the efficiency in its neighboring provinces. Moreover, as time progresses, the spatial correlation strengthens, and the spatial agglomeration degree of provinces with similar tourism development levels shows an increasing trend.

2.2.2 Local Spatial Correlation To identify the agglomeration patterns of tourism development efficiency in different provinces at various spatial locations, the Getis-Ord G_i statistic was used to classify China's tourism development efficiency into five types: hot spot areas, sub-hot areas, sub-cold areas, cold spot areas, and non-significant areas. Following Xia Zancai et al., the G_i values for 2009, 2014, and 2019 were averaged, and local spatial pattern distribution maps were drawn based on the mean values. [Figure 4: see original paper] shows that the average comprehensive efficiency, average pure technical efficiency, and average scale efficiency of China's tourism development efficiency present a spatial pattern of "hot in the south and cold in the north." Hot spot areas represent high-level tourism efficiency agglomeration zones, showing clustered distribution in space. Cold spot areas represent low-level tourism efficiency agglomeration zones. Although these regions possess certain tourism resource foundations, their comprehensive resource allocation and utilization efficiency

are low, resulting in relatively backward tourism development efficiency.

Regarding average comprehensive efficiency, hot spot areas are mainly concentrated in Henan, Hubei, Anhui, Shanghai, Guizhou, Hunan, Jiangxi, Fujian, Guangxi, and Guangdong, while cold spot areas are primarily located in northwestern regions, including Xinjiang, Tibet, and Qinghai [Figure 4: see original paper]. For average pure technical efficiency, hot spot areas are mainly distributed in Zhejiang, Anhui, Henan, and Hubei, while cold spot areas are in Heilongjiang in northeastern China [Figure 4: see original paper]. For average scale efficiency, the distribution areas are relatively consistent with those of average comprehensive efficiency hot spot areas, while cold spot areas remain concentrated in northwestern regions [Figure 4: see original paper].

2.3 Influencing Factors of Tourism Development Efficiency

To further clarify the influencing factors of provincial tourism development efficiency, regression analysis was conducted between tourism comprehensive efficiency, pure technical efficiency, and scale efficiency with regional economic development level, tourism resource quality, tourism development quality, and transportation accessibility .

Comprehensive Efficiency. Regional economic development level, tourism resource quality, tourism development quality, and transportation accessibility all directly affect tourism comprehensive efficiency. In terms of influence degree, tourism resource quality dominates among the factors affecting comprehensive efficiency, likely because tourism resources serve as the core attraction of destinations and yield higher benefits than other factors under certain tourism factor input levels. Therefore, improving tourism resource quality should be central, with enhancement of tourism development quality, economic development level, and transportation accessibility as priorities to promote and optimize tourism comprehensive efficiency.

Pure Technical Efficiency. Regional economic development level, tourism development quality, and transportation accessibility all significantly affect pure technical efficiency, while tourism resource quality shows no significant effect. This may be because regions with high pure technical efficiency have low tourism resource allocation and transformation efficiency, resulting in weak correlation between pure technical efficiency and tourism resource quality. Regarding influence degree on pure technical efficiency, transportation accessibility > tourism development quality > regional economic development level, indicating that transportation accessibility plays a key role in promoting pure technical efficiency improvement.

Scale Efficiency. Regional economic development level, tourism development quality, and tourism resource quality have positive effects on scale efficiency, while transportation accessibility shows no significant effect and has low influence. This may be because regions with low scale efficiency have poor transportation conditions that fail to meet local tourism development needs, thus showing

non-significant results in regression. Regarding influence degree on tourism scale efficiency, tourism development quality > tourism resource quality > regional economic development level, confirming that tourism development quality is an important support for improving tourism scale efficiency. When tourism development quality is high, tourism benefits further improve the transformation rate of tourism factors, thereby enhancing tourism development efficiency.

In summary, regional economic development level and tourism development quality are key factors causing spatial differentiation in tourism development efficiency, with tourism development quality having the strongest driving effect. To achieve the "quality and efficiency improvement" goal of China's tourism high-quality development, efforts should focus on enhancing economic development levels and improving tourism development quality as the core, accelerating the rationality of tourism resource allocation and input-output transformation rates. Simultaneously, improving regional economic development levels and transportation accessibility, promoting the autonomous and orderly flow of tourism factors, and optimizing tourism development efficiency through increased tourism factor inputs will comprehensively achieve the transformation and upgrading of China's tourism industry.

3. Conclusions

This study measures China's provincial tourism development efficiency using the DEA model and reveals the spatiotemporal evolution patterns and influencing factors of tourism efficiency through spatial statistical analysis. The main conclusions are as follows:

1) From 2009 to 2019, China's tourism efficiency showed a steady upward trend, with certain progress in provincial tourism development intensification. The spatial distribution of comprehensive efficiency, pure technical efficiency, and scale efficiency levels showed significant differences, with spatial agglomeration characteristics gradually strengthening, and the tourism growth mode transitioning from extensive to intensive development.

2) China's provincial tourism development efficiency exhibits significant spatial positive correlation. The average comprehensive efficiency, average pure technical efficiency, and average scale efficiency show a spatial pattern of "hot in the south and cold in the north." The spatial agglomeration patterns of average comprehensive efficiency and average scale efficiency are similar, with hot spot areas concentrated in central and southern provinces and cold spot areas concentrated in northwestern regions. The hot spot areas of average pure technical efficiency are mainly distributed in Zhejiang, Anhui, Henan, and Hubei, while the cold spot area is Heilongjiang in northeastern China.

3) Regional economic development level, tourism resource quality, tourism development quality, and transportation accessibility are the main fac-

tors influencing tourism development efficiency. Among them, tourism resource quality is the primary positive factor affecting comprehensive efficiency, pure technical efficiency is mainly positively affected by transportation accessibility, and scale efficiency is mainly positively driven by tourism development quality. Promoting regional economic development, improving tourism development quality, and enhancing tourism resource utilization transformation rates are important for improving tourism efficiency.

4. Policy Recommendations

4.1 Enrich Tourism Product Formats and Enhance Innovation in Development Models

Pure technical efficiency has become one of the key factors affecting tourism development efficiency. Therefore, internet platforms should be fully utilized to enhance scientific and technological innovation levels and stimulate novel tourism creativity. Specifically, governments should maintain a positive attitude toward tourism investment, technical support, and legal guarantees, driving tourism format innovation through policies. Using "Internet+" as a means, they should promote innovation in tourism production models, service methods, and management experience to expand tourism consumption space. Grasping new trends in technological development and relying on digital technologies such as the Internet of Things, big data, and artificial intelligence, they should establish diversified emerging tourism systems integrating smart management, smart services, and smart marketing to achieve refined tourism management, intelligent tourism services, innovative tourism products, and precise tourism marketing, thereby driving dynamic changes in tourism development quality and tourism efficiency.

4.2 Establish and Improve Regional Tourism Cooperation Mechanisms to Narrow Provincial Disparities

Southern regions have sound economic foundations and convenient transportation accessibility, providing solid financial, human, and intellectual support for tourism development. Although northwestern regions possess abundant natural resources and historical-cultural resources, their weak economic foundations, lack of tourism infrastructure, and low input and utilization rates in tourism resource development have resulted in backward tourism development efficiency. Therefore, governments at all levels should break administrative barriers, deepen cross-regional tourism cooperation, and pay attention to the mix of tight and loose policies. They should improve tourism infrastructure such as transportation and networks to achieve resource connectivity, information sharing, transportation accessibility, and policy coordination among China's eastern, central, and western regions. They should jointly create advantageous tourism resources and series of themed high-quality tourism routes, jointly develop tourism products with regional characteristics and cultural connotations, and jointly organize

large-scale promotional fairs, major events, and festival activities to conduct cooperative tourism marketing campaigns, making regional tourism cooperation a catalyst for high-quality economic growth.

4.3 Optimize Tourism Industry Structure and Enhance Tourism Development Efficiency

Analysis reveals that regional economic development level and tourism development quality have significant positive effects on tourism development efficiency, with tourism development quality having the strongest driving effect. To meet tourists' diversified needs, the superimposed effects of "tourism+" and "+tourism" should be fully utilized to promote the deep integration of tourism with related industries and accelerate the transformation and upgrading of the tourism industry structure. Entering the new development stage, all provinces should focus on improving economic development levels as the foundation, tourism industry transformation and upgrading as the goal, and enhancing tourism development quality as the priority. They should promote the all-around flow and efficient aggregation of various tourism factors, strengthen the spatial correlation of tourism industry efficiency, and enable the benefits of correlation to reach all provinces and cities, thereby constructing a high-quality tourism development pattern.

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Note: Figure translations are in progress. See original paper for figures.