Measurement and Analysis of Influencing Factors for High-Quality Development of the Tourism Economy: A Case Study of Xinjiang (Postprint)

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Abstract

As the ninth largest industrial cluster in Xinjiang, high-quality development of the tourism economy serves as a leading driver for Xinjiang's modernization. Based on three perspectives—quality, efficiency, and tourist experience—a seven-dimensional measurement system for high-quality tourism economic development is constructed to evaluate Xinjiang's tourism economy from 2008 to 2023. GIS spatial visualization is employed to analyze spatiotemporal evolution characteristics, an obstacle degree model is utilized to identify sources of obstacles, and factor analysis combined with grey relational analysis is applied to explore influencing factors. The results indicate: (1) Although Xinjiang's initial level of high-quality tourism economic development was relatively low, it experienced rapid improvement following the 2018 "Tourism Revitalizes Xinjiang" strategy. (2) Significant spatiotemporal variations characterize Xinjiang's high-quality tourism economic development, exhibiting an overall pattern of north-south disparity (stronger in the north, weaker in the south) and east-west connectivity. Specifically, a "four-wheel drive" evolutionary pattern and a "one core and three points" symbiotic development structure are evident in Urumqi, counties and cities directly under the Ili Kazakh Autonomous Prefecture, Altay Prefecture, and Kashgar Prefecture. (3) The primary obstacle to Xinjiang's overall high-quality tourism economic development is weak regional innovation capability; for regions with lower development levels, the main obstacles are insufficient tourism market attractiveness and inadequate cultural tourism resource development. (4) Information services, economic support, and tourism transportation constitute the principal factors influencing Xinjiang's high-quality tourism economic development, while resource elements and tourism services are secondary factors. Notably, internet penetration, increased residents' disposable income, expanded fixed asset investment in the tertiary sector, and highway construction exert significant influences on Xinjiang's high-quality tourism economic development.

Full Text

Measurement and Analysis of Influencing Factors of High-Quality Development of Tourism Economy: A Case Study of Xinjiang

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Abstract: As the ninth largest industry cluster in Xinjiang, the high-quality development of the cultural and tourism industry plays a leading role in the region's modernization. Based on three perspectives—"quality, efficiency, and tourist experience"—this study constructs a seven-dimensional measurement system for high-quality development of the tourism economy. It measures the level of high-quality development of Xinjiang's tourism economy from 2008 to 2023, employs GIS spatial visualization to analyze its spatiotemporal evolution characteristics, identifies obstacle sources through the barrier degree model, and finally explores influencing factors using factor analysis and gray correlation analysis. The results indicate: (1) The initial level of high-quality development of Xinjiang's tourism economy was low, but improved rapidly after the "Tourism to Develop Xinjiang" strategy was proposed in 2018; (2) Significant spatiotemporal differences exist in the level of high-quality development of Xinjiang's tourism economy, showing an overall pattern of strong north and weak south with east-west connectivity, specifically manifested as a "four-wheel drive" evolution and a "one core with three points" symbiotic development pattern in Urumqi City, Ili Kazakh Autonomous Prefecture directly-administered counties and cities, Altay Prefecture, and Kashgar Prefecture; (3) The main obstacle to overall high-quality development of Xinjiang's tourism economy lies in insufficient regional innovation capacity; regions with lower levels face obstacles of weak tourism market attractiveness and underdeveloped cultural and tourism resources; (4) The primary factors influencing Xinjiang's tourism economy's high-quality development are information services, economic support, and tourism transportation, while secondary factors are resource elements and tourism services; notably, Internet popularization, rising disposable incomes, increased fixed-asset investment in the tertiary industry, and highway construction significantly impact Xinjiang's tourism economy high-quality development.

Keywords: tourism economy; high-quality development; spatiotemporal evolution; barrier degree model; factor analysis; gray correlation analysis

The high-quality development of the tourism economy represents a new driver for Xinjiang's economic and social development and an important force in advancing Xinjiang's modernization in the Chinese style. However, Xinjiang's tourism economy currently faces challenges including insufficient development

of tourism industrialization, imbalanced market supply, low marginal efficiency of the tourism industry, and inadequate environmental protection. Against this backdrop, analyzing the connotative characteristics of high-quality development, conducting scientific measurement and evaluation, accurately grasping the level and spatiotemporal differences of high-quality development across various prefectures and cities, and exploring obstacle sources and influencing factors hold significant theoretical and practical value.

According to the concept interpretation of tourism (product) quality by the World Tourism Organization in 2016, tourism (product) quality refers to the harmonious and sustainable development level among tourists, tourism practitioners, and tourism destination resources, cultural environments, and natural environments. Since the 14th Five-Year Plan period, China's principal social contradiction has undergone fundamental changes, with the economy shifting toward a high-quality development stage. The high-quality development of the tourism economy is essential for meeting people's needs for a better life and alleviating the contradiction between unbalanced and insufficient development. What, then, constitutes high-quality development of the tourism economy? What influences it? How can it be achieved? The new development philosophy provides the theoretical foundation and action guidelines. Therefore, this study focuses on the transformation of principal contradictions and the inherent requirements of achieving Chinese-style modernization, integrating the World Tourism Organization's definition of tourism quality, the new development philosophy, and the new characteristics of high-quality development to elaborate on and define the connotation of high-quality development of the tourism economy.

1 Data and Methods

1.1 Study Area Overview

As the core area of the Silk Road Economic Belt, Xinjiang has witnessed rapid tourism economic development in recent years. In 2019, the region received 215 million tourists with total tourism revenue reaching 363.26 billion yuan. Xinjiang also exhibits vulnerability in its tourism system, making it highly typical. With the proposal of the "Tourism to Develop Xinjiang" and "Prosperity for the People" strategies, tourism has become a crucial growth pole for Xinjiang. The 2023 Xinjiang Tourism Development Conference further emphasized the need to intensify cultural and tourism industry development, accelerate deep integration of culture and tourism, and facilitate high-quality development of the tourism economy. This indicates that Xinjiang's tourism economy is in a critical period of comprehensively promoting deep integration of culture and tourism. Despite abundant tourism resources, the degree of cluster development in cultural and tourism industries remains insufficient, tourism competitiveness is not strong enough, and there exist obvious obstacles to high-quality development alongside regional imbalances and insufficient development.

1.2 Data Sources

Data were obtained from the *China Statistical Yearbook*, *China City Statistical Yearbook*, *China Tertiary Industry Statistical Yearbook*, *China Culture and Tourism Yearbook*, *China Environmental Statistical Yearbook*, and *Xinjiang Statistical Yearbook* for 2009–2023, as well as statistical yearbooks and annual reports from various prefectures and cities in Xinjiang.

1.3 Theoretical Connotation and Indicator System for High-Quality Development of Tourism Economy

The high-quality development of the tourism economy must both reflect the guiding significance of the new development philosophy and represent the overall state of the "industry-tourist" relationship. In the new era, the connotation of high-quality development should be based on maintaining stable tourism industry development and achieving comprehensive improvement in "quality, efficiency, and tourist experience." From the "quality" perspective, high-quality development should reflect the continuous improvement process of the tourism economy, manifested in dynamic transformation, structural optimization, regional coordination, ecological governance, economic openness, and improvement of people's well-being. The new development philosophy fully embodies the "new quality" requirements: innovation as the power source, coordination as the internal requirement, green development as ecological sustainability, openness as the necessary path, and sharing as the essential requirement. From the "efficiency" perspective, the connotation lies in embodying the core principle of high-quality development—"quality first, efficiency priority"—highlighting the external manifestations and data evidence of tourism economic development: growth in total tourism economic volume, scale expansion, efficiency improvement, and increased factor productivity. From the "tourist experience" perspective, the connotation reflects the tourist validation of "supply-side structural reform," highlighting the main thread of high-quality development: tourist satisfaction is the most important dimension for evaluating high-quality development, directly affecting destination reputation and representing a key factor for sustained and healthy tourism economy development. Therefore, the connotation of high-quality tourism economic development encompasses: innovation in tourism industry technology, coordination in regional tourism resource allocation, sustainability of the tourism ecological environment, openness to external tourism markets, sharing of tourism infrastructure, effectiveness of tourism development, and comprehensive improvement of tourist satisfaction.

Based on an in-depth analysis of the connotation of high-quality tourism economic development, this study establishes a new value orientation and analytical framework oriented toward ecological sustainability, grounded in the five development philosophies, driven by economic benefits, and aimed at people's satisfaction. Accordingly, a measurement system for high-quality development levels of the tourism economy is constructed (Table 1).

1.4 Research Methods

1.4.1 Improved Entropy Weight Method Using standardized data, indicator weights are calculated according to the following formulas:

$$e_i = -\frac{1}{\ln m} \sum_{j=1}^{m} p_{ij} \ln p_{ij}$$

$$w_i = \frac{1 - e_i}{\sum_{i=1}^{n}(1 - e_i)}$$

$$p_{ij} = \frac{x_{ij}}{\sum_{j=1}^{m} x_{ij}}$$

where w_i represents the weight of indicator i; e_i is the information entropy of indicator i; and m is the number of indicators.

1.4.2 Barrier Degree Model A higher barrier degree indicates a greater obstacle effect of the indicator. The calculation formula is:

$$z_i = \frac{U_{iT_{ij}}}{\sum_{i=1}^{n} U_{iT_{ij}}} \times 100\%$$

where z_i is the barrier degree of indicator i; T_{ij} is the deviation degree of evaluation object j on indicator i; and U_i is the factor contribution degree of indicator i.

1.4.3 Factor Analysis Factor analysis effectively identifies potential correlation structures among multiple variables. After conducting KMO and Bartlett's sphericity tests on standardized data, common factors are extracted through factor loading analysis.

1.4.4 Grey Correlation Model

(1) Determine the comparison sequence $X_i(t)$ and reference sequence $Y_i(t)$:

$$x_i(t) = \frac{x_i(t) - \min(x_i(t))}{\max(x_i(t)) - \min(x_i(t))}$$

(2) Calculate the correlation coefficient (γ_i) and correlation degree (r_i):

$$\Delta_i(k) = |Y(k) - X_i(k)|$$

$$\gamma_i(k) = \frac{\min_i \min_k |Y(k) - X_i(k)| + \rho \max_i \max_k |Y(k) - X_i(k)|}{|Y(k) - X_i(k)| + \rho \max_i \max_k |Y(k) - X_i(k)|}$$

$$r_i = \frac{1}{n} \sum_{k=1}^{n} \gamma_i(k)$$

where $x_i(t)$ and $y_i(t)$ represent the values of x and y at time t and sequence i; i is the sequence number; and t is the time period.

2 Results and Analysis

2.1 Measurement of High-Quality Development Level of Xinjiang's Tourism Economy

2.1.1 Comprehensive Analysis of Xinjiang's High-Quality Development Level   A quantitative measurement of Xinjiang's tourism economy high-quality development level from 2008 to 2023 was conducted (Table 2). The results show that Xinjiang's tourism economy started from a low base. Although fluctuations occurred during 2008–2018, the overall trend was upward. The growth rate increased significantly during 2018–2023, likely closely related to the first proposal of the "Tourism to Develop Xinjiang" strategy in 2018, demonstrating that strategic deployment and policy guidance play crucial roles in promoting high-quality tourism economic development.

2.1.2 Spatiotemporal Evolution Characteristics of High-Quality Development Levels Across Xinjiang's Prefectures and Cities   Four time cross-sections (2008, 2013, 2018, and 2023) were selected to deeply investigate the spatiotemporal evolution characteristics of high-quality development across Xinjiang's prefectures and cities (Figure 2). The results reveal that while growth has been relatively slow, the overall pattern shows "strong north, weak south, with east-west connectivity," specifically manifested as a "four-wheel drive" evolution and a "one core with three points" symbiotic development pattern in Urumqi City, Ili Kazakh Autonomous Prefecture directly-administered counties and cities, Altay Prefecture, and Kashgar Prefecture, with significant spatiotemporal differences. The reasons are as follows: As Xinjiang's central city, Urumqi possesses unique location advantages and concentrates substantial resource elements. The Ili Kazakh Autonomous Prefecture directly-administered areas benefit from rich tourism resources and the establishment of the Khorgos National Economic Development Zone, resulting in high openness levels. Altay Prefecture has enhanced its tourism appeal by strengthening the application of new-quality productive forces such as data marketing in tourism promotion. Kashgar Prefecture has vigorously developed all-for-one tourism, introducing an innovative "Tourism Plus" model that continuously raises its profile. These "four-wheel drive" centers serve as Xinjiang's tourism hub cities, all demonstrating significant tourism economic spillover effects.

2.2 Barrier Sources and Influencing Factors

2.2.1 Barrier Sources to High-Quality Development of Xinjiang's Tourism Economy To quantitatively analyze challenges facing Xinjiang's tourism economy high-quality development, the barrier degree model was employed to measure primary obstacle sources (Table 3). Overall, Xinjiang's tourism economy high-quality development is mainly constrained by regional innovation capacity. Specifically, regions with higher development levels are hindered by uncoordinated regional tourism development and low tourism labor productivity and capital output rates. Medium-high level regions face obstacles of insufficient innovation capacity and mismatched tourism supply and demand. Medium-low level regions struggle with prominent issues of uncoordinated tourism supply-demand and inconvenient tourism transportation. Lower-level regions are primarily constrained by weak tourism market attractiveness and underdeveloped cultural and tourism resources. Therefore, Xinjiang's primary task in promoting high-quality tourism economic development is to continuously increase innovation investment and advance coordinated regional tourism development. For regions with weaker tourism economies, infrastructure construction must be strengthened and openness and sharing levels improved.

2.2.2 Selection of Influencing Factors for High-Quality Development Combining development economics theory, this study analyzes major factors that may influence high-quality development (Figure 3): factor inputs, technological progress, human capital, institutional environment, and market demand.

2.2.3 Factor Analysis Using SPSS 22.0 software, factor analysis was conducted on standardized data. KMO and Bartlett's sphericity tests yielded a KMO value of 0.735 and Bartlett's test p<0.001, indicating good consistency among variables and the existence of a potential factor structure, thus confirming the dataset's suitability for factor analysis. Factor loading analysis revealed that extracting five common factors achieved a cumulative variance explanation rate of 83.403%, effectively retaining original data characteristics. The Varimax method was employed for orthogonal rotation to obtain the rotated factor loading matrix, with common factors named: tourism transportation, tourism services, economic support, resource elements, and information services (Table 4).

2.2.4 Grey Correlation Analysis The grey correlation model was used to calculate the correlation degree between various influencing factors and Xinjiang's tourism economy high-quality development (Table 5). Based on correlation strength: information services > economic support > tourism transportation > resource elements > tourism services. The reasons are as follows: The ongoing digitalization of tourism has made information services an endogenous driver of high-quality development, playing crucial roles in tourism product development and promotion. Tourism is an integrated economic activity encompassing "food, accommodation, transportation, sightseeing, shopping, and

entertainment," closely linked with the tertiary sector and requiring economic support and tourism transportation as developmental foundations. Lower correlation degrees for resource elements and tourism services indicate that Xinjiang's tourism workforce quality, service levels, and standards need improvement. Further analysis reveals that fixed Internet broadband subscribers, disposable income, tertiary industry fixed-asset investment, and highway mileage show high correlation with high-quality development, while university student numbers and travel agency numbers show weaker correlation. This demonstrates that over the past 15 years, Internet popularization, rising disposable incomes, increased tertiary industry fixed-asset investment, and highway construction have significantly influenced Xinjiang's tourism economy high-quality development.

3 Discussion

High-quality development of the tourism economy is a crucial issue in the new era and an inevitable trend of internal factor optimization. Therefore, the connotation of high-quality tourism economic development must reflect the new development philosophy, consistent with existing research perspectives. However, connotation interpretation and measurement based solely on the new development philosophy cannot fully capture the core and main thread of high-quality development. Consequently, when interpreting the connotation of high-quality tourism economic development, it is essential to organically integrate and comprehensively consider precise quality control, significant efficiency improvements, and tourist satisfaction. This represents the most prominent difference between this study and existing research. Based on three perspectives—"quality, efficiency, and tourist experience"—this study interprets and represents the connotation of high-quality tourism economic development across seven dimensions: innovation, coordination, green development, openness, sharing, efficiency, and tourist evaluation.

Some conclusions align with previous studies. For instance, spatiotemporal evolution analysis reveals that Xinjiang's tourism economy high-quality development shows a "strong north, weak south, with east-west connectivity" pattern, confirming significant spatiotemporal differentiation. Furthermore, by narrowing the research scale and considering the interactive nature and broad spatiotemporal characteristics of high-quality development across Xinjiang's prefectures and cities, this study proposes a "four-wheel drive" evolution and a "one core with three points" symbiotic development pattern in Urumqi, Ili Prefecture directly-administered areas, Altay Prefecture, and Kashgar Prefecture, corroborating the "multi-center drive" evolution and "one core with multiple points" symbiotic pattern. Regarding obstacle identification, Xinjiang's tourism economy high-quality development is mainly limited by regional innovation capacity and coordination degree, confirming that western China's tourism economy high-quality development lags in innovation and coordination subsystems. Additionally, this study conducts cluster identification of obstacle sources for different prefectures and cities based on their development levels, identifying

major obstacles faced by different types of regions to propose targeted policy recommendations. Concerning influencing factors, information services, economic support, and tourism transportation are primary factors, confirming that digital infrastructure construction and intercity train operations can effectively promote high-quality development. This study further reveals that resource elements and tourism services are secondary factors, with Internet popularization, rising disposable incomes, increased tertiary industry fixed-asset investment, and highway construction significantly impacting Xinjiang's tourism economy high-quality development.

4 Conclusions and Recommendations

4.1 Conclusions

(1) Xinjiang's tourism economy high-quality development started from a low base. Despite fluctuations during 2008–2023, the overall trend was upward. However, a significant increase occurred after the 2018 "Tourism to Develop Xinjiang" strategy, highlighting the importance of strategic support and policy guidance.

(2) Significant spatiotemporal differences exist in Xinjiang's tourism economy high-quality development levels, showing an overall pattern of "strong north, weak south, with east-west connectivity," specifically manifested as a "four-wheel drive" evolution and a "one core with three points" symbiotic development pattern in Urumqi, Ili Prefecture directly-administered areas, Altay Prefecture, and Kashgar Prefecture. Beyond resource endowments, this pattern is closely related to transportation, climate, culture, and other factors. As Xinjiang's tourism hub, the "four-wheel drive" centers not only boast abundant tourism resources but also serve as key nodes in the north-south transportation network and important engines for achieving joint infrastructure construction, cultural symbiosis, resource sharing, and industrial collaboration.

(3) Overall, Xinjiang's tourism economy high-quality development is primarily constrained by regional innovation capacity. Specifically, higher-level regions are hindered by uncoordinated regional tourism development and low tourism labor productivity and capital output rates. Medium-high level regions face obstacles of insufficient innovation capacity and mismatched tourism supply and demand. Medium-low level regions struggle with prominent issues of uncoordinated tourism supply-demand and inconvenient tourism transportation. Lower-level regions are mainly constrained by weak tourism market attractiveness and underdeveloped cultural and tourism resources.

(4) Information services, economic support, and tourism transportation are primary factors influencing Xinjiang's tourism economy high-quality development, while resource elements and tourism services are secondary factors. Notably, Internet popularization, rising disposable incomes, in-

creased tertiary industry fixed-asset investment, and highway construction significantly impact Xinjiang's tourism economy high-quality development.

4.2 Recommendations

(1) **Enhance policy support and deepen all-for-one tourism development.** Based on the "Tourism to Develop Xinjiang" strategy, continuously strengthen policy support through top-level planning and supervision to scientifically guide the sound and rapid development of cultural and tourism industries. Vigorously promote all-for-one tourism, fully leveraging the leading role of A-level scenic spots to create radiating effects that drive overall development.

(2) **Promote regional cooperation and achieve balanced tourism development across Xinjiang through the "four-wheel drive" approach.** Given significant differences between the "four-wheel drive" tourism hub cities and other regions, promote cross-regional integration of cultural and tourism resources, eliminate administrative barriers, and facilitate free circulation of various elements within Xinjiang. Incentivize tourism enterprises to develop multiple high-quality, high-value-added tourism circuits.

(3) **Improve service supply and enrich "Tourism Plus" new business formats.** Relying on ethnic medicine parks, develop "health and wellness tourism"; utilizing abundant ecological resources, promote "ecological tourism"; integrating characteristic industrial clusters, develop "industrial tourism"; and leveraging beautiful rural towns, promote "leisure tourism." Guide events such as music festivals, concerts, urban marathons, and road cycling to shape tourism through culture, enriching "Tourism Plus" new business formats.

(4) **Strengthen digital empowerment and build regional characteristic cultural and tourism industry clusters.** Accelerate the digital transformation of Xinjiang's cultural and tourism industries, fully leveraging digital empowerment mechanisms to develop new tourism products and services. Promote optimization and upgrading of the cultural and tourism industry structure, focusing on building characteristic cultural and tourism industry clusters themed around natural landscapes, folk culture, and border trade.

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Measurement and influencing factors of high-quality development of tourism economy: A case of Xinjiang

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Abstract: As the ninth largest industry cluster in Xinjiang, the high-quality development of the tourism economy plays a leading role in the region's modernization in China. This study constructs a seven-dimensional measurement system to evaluate the high-quality development of the tourism economy based

on three perspectives: quality, efficiency, and tourist experience. The level of high-quality development in Xinjiang's tourism economy from 2008 to 2023 is measured, employing geographic information systems spatial visualization to analyze its spatial and temporal evolution characteristics. In addition, the study identifies obstacle sources using the obstacle degree model and explores influencing factors through factor analysis and gray correlation analysis. The results indicate the following. (1) The initial level of high-quality development of the tourism economy in Xinjiang is low, but it has improved rapidly since the introduction of the "tourism to develop Xinjiang" strategy in 2018. (2) Significant spatial and temporal differences in the level of high-quality development are observed within Xinjiang's tourism economy. The overall trend shows strong development in the north and weaker development in the south, with the east and west exhibiting coherence. This is specifically reflected in the cities of Urumqi, the Ili Kazakh Autonomous Prefecture, the Altay Prefecture, and the Kashgar Prefecture, demonstrating a "four-wheel drive" evolution and a "core of three points" symbiotic development pattern. (3) The overall high-quality development of the tourism economy in Xinjiang is primarily constrained by regional innovation capacity. Regions with lower levels of high-quality development face challenges due to a lack of tourism market attractiveness and underdeveloped cultural and tourism resources. (4) Key factors affecting the high-quality development of Xinjiang's tourism economy include information services, economic support, and tourism transportation, whereas resource elements and tourism services are considered secondary factors. Notably, factors such as increased Internet accessibility, rising disposable incomes, higher fixed-asset investment in the tertiary industry, and expanded highway infrastructure significantly affect the high-quality development of Xinjiang's tourism economy.

Keywords: tourism economy; high-quality development; spatiotemporal evolution; barrier degree model; factor analysis; gray correlation analysis

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

Source: ChinaXiv — Machine translation. Verify with original.