

# Research on the Measurement of High-quality Development Level of Provincial Tourism in China

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## Abstract

Based on the connotation of high-quality development theory, this paper establishes an evaluation index system for high-quality tourism development encompassing five dimensions: innovation, coordination, green, openness, and sharing. Entropy weight TOPSIS method is adopted to measure the high-quality tourism development level of 30 provinces in China. The findings reveal that from 2012 to 2019, the high-quality development level of China's tourism generally exhibited a steady upward trend, with a notable decline in 2020 due to the influence of the epidemic and other factors. However, the pace and extent of development vary significantly among provinces, showing an unbalanced trend. Regarding the sub-dimensions, the green dimension has seen significant growth, while the innovation, sharing, and coordination dimensions have experienced fluctuating advancements. The openness dimension warrants greater attention. Consequently, this paper proposes recommendations focusing on tourism resources, infrastructure development, and environmental protection to enhance the level of tourism development.

## Keywords

High Quality Development; Entropy Weight TOPSIS Method; Tourism Economy.

## 1. Introduction

In the context of the new normal economic period, "high-quality development" has become an important strategy for both economic and social development. High-quality development not only prioritizes the enhancement of scale but also places a greater focus on the quality and efficiency of growth, with a particular emphasis on developmental innovation and modality. As a strategic pillar industry of China's national economy, the high-quality development of tourism is a strong support for promoting Chinese-style modernization and an important interpretation of the concept of high-quality development.

Since the inception of the concept of high-quality tourism development in China, scholars have conducted extensive and in-depth studies on its connotation, evaluation methodologies, and influencing factors. Evaluation research has delved into the high-quality development of red tourism, examining the developmental disparities across various provinces and proposing targeted improvement strategies[1]. Additionally, the tourism development level of China's provinces has been quantified through the establishment of a high-quality tourism economic development index system, with a subsequent analysis of regional differences[2]. The majority of studies on the factors influencing tourism development quality are anchored in an evaluation index system, employing diverse models such as the spatial Durbin model and Tobit model to identify determinants of tourism economic development. Currently, research on influencing factors encompasses aspects like transportation accessibility, urban economic development settings, tourism industry concentration, and the level of informatization[3,4].

Based on the theoretical connotation of high-quality development and the existing research findings, this paper develops an indicator system for assessing high-quality tourism development in China. By applying the entropy weight TOPSIS method, the study evaluates the levels of high-quality tourism development in 30 Chinese provinces. This paper seeks to identify trends and regional variations in tourism development, with the intention of contributing to the industry's transformation and improvement in China.

## 2. Research Design

### 2.1. The High-quality Tourism Development Index System

Using the concept of high-quality development and building on prior studies, this paper establishes an evaluation index system for assessing the high-quality development of China's tourism across five dimensions: innovation, coordination, green, openness, and sharing, as outlined in Table 1.

**Table 1.** High-Quality Tourism Development Evaluation Index System

First-level index	Secondary indicators	Index attribute	Units
Innovation	Tourism R&D funding	Positive	Yuan
	Tourism labor productivity	Positive	%
	Tourism capital productivity	Positive	%
Coordination	Coordination level of tourism industry	Positive	%
	Ratio of per capita disposable income of urban and rural residents	Negative	%
	GDP per capita	Positive	Yuan
Green	Solid waste production per unit of GDP	Negative	Tons/yuan
	Daily treatment capacity of urban sewage	Positive	Million cubic meters
	Harmless disposal rate of household waste	Positive	%
	Green coverage rate of built-up areas	Positive	%
Openness	Proportion of foreign exchange income from tourism in total tourism revenue	Positive	%
	Inbound tourist arrivals accounted for the proportion of total tourist arrivals	Positive	%
Sharing	Number of A-level scenic spots	Positive	per 10,000 people
	Number of public toilets	Positive	per 10,000 people
	Per capita tourism income	Positive	Yuan/person
	Total passenger turnover	Positive	km

From the innovation dimension, referring to the practices of Meng Yang et al., indicators such as tourism R&D funding, tourism labor productivity and tourism capital productivity are selected to measure provincial innovation inputs and outputs[5]. Tourism R&D funding is calculated as the ratio of the whole society's R&D funds multiplied by the tourism output value to the gross national economic product. Tourism labor productivity is the ratio of total tourism revenue to the number of tourism employees, and tourism capital productivity is the ratio of total tourism revenue to the total fixed investment. For the coordination dimension, referring to the practice of Hong Tian et al., indicators including the ratio of per capita disposable income of urban and rural residents, coordination level of tourism industry and per capita GDP are

selected[6]. Among them, the coordination level of tourism industry is the proportion of tourism income in the tertiary industry. The green dimension encompasses indicators like solid waste generation per unit GDP, daily urban sewage treatment capacity, harmless treatment rate of household garbage, and green coverage rate of built-up areas. In the terms of opening dimension, following Zancai Xia et al., the proportion of foreign exchange income from tourism in the total tourism revenue and the proportion of inbound tourist visits in the total tourist visits are selected to represent the level of opening-up and acceptance of the province[7]. In the sharing dimension, the number of A-level scenic spots per 10,000 people, the number of public toilets per 10,000 people, the per capita tourism income and the volume of tourist turnover are selected[8].

## 2.2. Evaluation Method

The Entropy weight TOPSIS method is a comprehensive evaluation technique that integrates the objectivity of entropy weighting with the relative closeness assessment of TOPSIS. Initially, the entropy weight method determines the weight of each evaluation index, enhancing the objectivity of the index system by reflecting the importance of each indicator. Subsequently, these weights are applied to the evaluation index data, which is then analyzed using the TOPSIS method. TOPSIS calculates the relative closeness of each alternative to the ideal solution, based on a matrix of normalized original data, thereby assessing the quality of the evaluation objects. This study employs the combined entropy weight and TOPSIS approach. The calculation process is detailed as follows. The first step is to standardize the original data, calculate the entropy weight, and assign weights to the evaluation indicators. The second step is to calculate the approximation degree. TOPSIS method is used to calculate the Euclidean distance and approximation degree between the index and the positive and negative ideal solution. The closeness degree can reflect the quality of the evaluation object to a certain extent. The larger the value, the higher the high-quality development level of regional tourism; the smaller the value, the lower the high-quality development level of regional tourism.

## 2.3. Data Sources

This study encompasses an evaluation of high-quality tourism development across 30 provinces in China from 2012 to 2022, excluding Xizang, Hong Kong, Macao, and Taiwan. The data for the indices are primarily sourced from the China Cultural Relics and Tourism Statistical Yearbook, the China City Statistical Yearbook, and provincial government reports for the years 2012-2022. Where data were incomplete, interpolation was utilized to estimate the missing values.

## 3. Results and Discussions

In line with the principles of high-quality development, this paper has developed an evaluation index system for the high-quality development of China's tourism economy across five dimensions: innovation, coordination, green, openness, and sharing. Utilizing the entropy weight TOPSIS method, the study evaluates and ranks the high-quality tourism development of 30 provinces in China from 2012 to 2022, analyzing score variations across different dimensions and the ranking of each province. Overall, except for a temporary decline in 2020 due to the epidemic and other factors, there is a general upward trend. Guangdong Province stands out with the highest overall score, indicating its advanced level of tourism economic development. While there have been minor fluctuations in the comprehensive scores of other provinces, the overall trend is positive, signifying the ongoing enhancement of China's tourism industry, attributed to policy initiatives and advancements in infrastructure.

**Table 2.** Ranking of High-Quality Tourism Development Levels in 30 Chinese Provinces

Province	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Rank
Guangdong	0.57	0.56	0.53	0.29	0.30	0.29	0.30	0.31	0.30	0.42	0.39	1
Jiangsu	0.18	0.18	0.18	0.19	0.21	0.22	0.24	0.26	0.24	0.26	0.26	2
Shanghai	0.18	0.19	0.17	0.19	0.18	0.18	0.19	0.18	0.16	0.15	0.19	3
Shandong	0.15	0.14	0.15	0.16	0.17	0.19	0.18	0.17	0.16	0.17	0.18	4
Zhejiang	0.13	0.13	0.14	0.14	0.15	0.16	0.16	0.18	0.16	0.18	0.19	5
Tianjin	0.13	0.14	0.16	0.14	0.15	0.13	0.12	0.15	0.16	0.13	0.13	6
Beijing	0.13	0.12	0.12	0.12	0.13	0.13	0.14	0.15	0.14	0.14	0.15	7
Fujian	0.16	0.14	0.13	0.13	0.14	0.14	0.11	0.12	0.12	0.12	0.14	8
Liaoning	0.22	0.14	0.09	0.09	0.11	0.11	0.12	0.13	0.11	0.12	0.12	9
Henan	0.10	0.09	0.10	0.10	0.10	0.11	0.12	0.12	0.10	0.11	0.11	10
Yunnan	0.10	0.09	0.08	0.10	0.10	0.11	0.12	0.11	0.11	0.09	0.11	11
Anhui	0.10	0.09	0.09	0.09	0.09	0.10	0.11	0.12	0.10	0.11	0.11	12
Hunan	0.09	0.09	0.09	0.09	0.09	0.10	0.12	0.12	0.10	0.11	0.11	13
Hubei	0.09	0.08	0.09	0.09	0.10	0.10	0.11	0.11	0.10	0.11	0.12	14
Neimenggu	0.09	0.12	0.09	0.09	0.09	0.10	0.11	0.11	0.09	0.11	0.11	15
Guangxi	0.10	0.09	0.09	0.09	0.08	0.09	0.10	0.12	0.09	0.10	0.09	16
Guizhou	0.06	0.07	0.06	0.07	0.09	0.11	0.13	0.15	0.08	0.09	0.09	17
Xinjiang	0.09	0.09	0.09	0.08	0.08	0.08	0.09	0.09	0.08	0.10	0.11	18
Shaanxi	0.09	0.08	0.07	0.08	0.08	0.09	0.09	0.10	0.08	0.09	0.09	19
Hebei	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.10	0.07	0.09	0.08	20
Shanxi	0.08	0.08	0.05	0.06	0.07	0.11	0.13	0.14	0.06	0.07	0.06	21
Sichuan	0.07	0.06	0.07	0.07	0.08	0.08	0.10	0.09	0.08	0.10	0.10	22
Chongqing	0.07	0.07	0.08	0.07	0.08	0.08	0.08	0.10	0.08	0.09	0.10	23
Gansu	0.04	0.04	0.04	0.04	0.05	0.06	0.39	0.07	0.06	0.07	0.06	24
Jilin	0.06	0.06	0.07	0.08	0.09	0.09	0.10	0.11	0.07	0.08	0.08	25
Jiangxi	0.06	0.06	0.06	0.07	0.08	0.09	0.10	0.10	0.08	0.09	0.08	26
Heilongjiang	0.07	0.10	0.08	0.07	0.07	0.06	0.07	0.07	0.06	0.08	0.08	27
Qinghai	0.04	0.04	0.05	0.06	0.06	0.07	0.07	0.16	0.08	0.09	0.10	28
Hainan	0.07	0.06	0.05	0.05	0.05	0.07	0.07	0.08	0.07	0.08	0.08	29
Ningxia	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06	0.06	30

### 3.1. Analysis of the Five High-quality Tourism Development Indexes

Table 3 indicates that between 2012 and 2015, there was a slight decline in the overall score for China's high-quality tourism development, while the scores for innovation, coordination, green, and sharing dimensions generally showed a steady increase. From 2016 to 2022, the overall score experienced fluctuations, with a period of rapid growth post-2016. The score dropped significantly to 0.1071 in 2020 due to the epidemic, but it began to recover gradually after 2021, reaching 0.1141 by the end of 2022.

The dimensions of innovation, sharing, and coordination have demonstrated consistent improvement, with noticeable progress until the epidemic's outbreak in 2020, which led to a decline in tourist numbers and industry practitioners, followed by fluctuations as the pandemic situation evolved. The implementation of China's tourism policies, including the 14th Five-Year Plan for tourism development, initiatives to promote smart tourism, and efforts to foster integration across tourism and other sectors, have collectively improved the tourism industry's development environment. These policy introductions, along with strong governmental support, have contributed to the gradual recovery of the index scores. In the green dimension, scores have been incrementally rising, suggesting improvements in ecological and environmental protection, albeit with ongoing challenges. Conversely, the openness dimension's poor performance has emerged as a critical barrier to high-quality development, underscoring the need for strategies to enhance openness levels.

**Table 3.** High-Quality Tourism Development Level by Dimension

Year	Overall	Innovation	Coordination	Green	Openness	Sharing
2012	0.114	0.075	0.081	0.156	0.112	0.155
2013	0.110	0.083	0.088	0.167	0.103	0.137
2014	0.106	0.083	0.094	0.172	0.089	0.150
2015	0.099	0.091	0.101	0.182	0.066	0.155
2016	0.106	0.104	0.111	0.190	0.065	0.165
2017	0.112	0.123	0.124	0.193	0.058	0.182
2018	0.130	0.159	0.159	0.206	0.050	0.211
2019	0.129	0.153	0.149	0.218	0.048	0.221
2020	0.107	0.114	0.114	0.232	0.055	0.153
2021	0.120	0.134	0.131	0.246	0.060	0.172
2022	0.122	0.124	0.131	0.256	0.068	0.165
Mean	0.114	0.113	0.117	0.202	0.070	0.170

### 3.2. Regional Difference in High-quality Tourism Development Level

Table 4 presents the scores and rankings of the five dimensions of high-quality tourism development across 30 provinces, revealing an uneven development landscape. In the innovation dimension, Guangdong, Jiangsu, Shandong, and Zhejiang secure the top positions, with a significant lead over Shanghai in fifth place, while Hainan and Ningxia are at the bottom. For coordinated development, Beijing, Shanghai, and Tianjin lead, contrasted with Qinghai, Heilongjiang, and Ningxia at the lower end. In green development, Guangdong and Jiangsu dominate, with a considerable gap to Shandong in third place, and Qinghai trails significantly, showing a 3.5-fold difference in index scores compared to Guangdong. Regarding the openness index, Guangdong's score of 0.44 is markedly higher than other provinces, indicating a greater degree of openness, whereas Gansu is at the bottom, suggesting a need for more extensive tourism development outreach. The sharing dimension exhibits minimal score variance among provinces.

Assessing the ranking fluctuations, Guangdong consistently leads in innovation, green, openness, and sharing, yet its coordination score is comparatively lower, highlighting a need for more strategic resource allocation. Jiangsu follows in innovation, green, and sharing but lags in coordination and openness, indicating strengths in tourism innovation and ecological protection but a need to invigorate tourism dynamics. Gansu's relative success in coordinated development is noted, yet there is room for improvement in ecological protection and utilization, as well as a necessity to foster innovation and enhance external promotion.

**Table 4.** High-Quality Tourism Development Index Scores in 30 Provinces

Innovation		Coordination		Green		Openness		Sharing	
Guangdong	0.35	Beijing	0.20	Guangdong	0.76	Guangdong	0.44	Guangdong	0.24
Jiangsu	0.34	Shanghai	0.19	Jiangsu	0.59	Shanghai	0.18	Jiangsu	0.23
Shandong	0.26	Tianjin	0.17	Shandong	0.39	Tianjin	0.13	Henan	0.22
Zhejiang	0.22	Guizhou	0.17	Zhejiang	0.35	Fujian	0.13	Qinghai	0.22
Shanghai	0.16	Jiangsu	0.16	Liaoning	0.30	Beijing	0.10	Hunan	0.21
Beijing	0.13	Zhejiang	0.14	Shanghai	0.27	Yunnan	0.09	Zhejiang	0.21
Liaoning	0.12	Fujian	0.14	Henan	0.25	Liaoning	0.09	Neimenggu	0.20
Henan	0.12	Yunnan	0.13	Hubei	0.25	Neimenggu	0.08	Anhui	0.19
Hubei	0.11	Gansu	0.12	Guangxi	0.25	Hainan	0.07	Xinjiang	0.19
Hunan	0.11	Jiangxi	0.12	Sichuan	0.23	Xinjiang	0.07	Shandong	0.19
Tianjin	0.11	Guangxi	0.12	Anhui	0.22	Zhejiang	0.07	Beijing	0.19
Fujian	0.11	Guangdong	0.12	Hunan	0.22	Guangxi	0.06	Shaanxi	0.18
Anhui	0.11	Neimenggu	0.12	Beijing	0.21	Chongqing	0.06	Hubei	0.17
Shanxi	0.11	Shanxi	0.12	Hebei	0.20	Shaanxi	0.06	Jiangxi	0.17
Guizhou	0.10	Jilin	0.11	Heilongjiang	0.17	Heilongjiang	0.05	Guizhou	0.17
Sichuan	0.09	Chongqing	0.11	Fujian	0.16	Jilin	0.05	Hebei	0.17
Gansu	0.09	Shaanxi	0.11	Shaanxi	0.13	Hubei	0.05	Gansu	0.17
Hebei	0.09	Liaoning	0.11	Jiangxi	0.12	Anhui	0.05	Tianjin	0.17
Jilin	0.08	Hubei	0.11	Chongqing	0.12	Shandong	0.04	Liaoning	0.17
Chongqing	0.08	Anhui	0.11	Jilin	0.12	Jiangsu	0.04	Sichuan	0.16
Jiangxi	0.08	Shandong	0.10	Tianjin	0.10	Shanxi	0.03	Guangxi	0.16
Yunnan	0.07	Sichuan	0.10	Shanxi	0.10	Hunan	0.03	Heilongjiang	0.15
Guangxi	0.07	Hunan	0.09	Yunnan	0.10	Hebei	0.02	Yunnan	0.15
Shaanxi	0.06	Henan	0.09	Xinjiang	0.09	Jiangxi	0.02	Jilin	0.14
Neimenggu	0.06	Hainan	0.08	Guizhou	0.08	Henan	0.02	Fujian	0.14
Heilongjiang	0.04	Hebei	0.08	Neimenggu	0.08	Sichuan	0.02	Shanghai	0.12
Hainan	0.04	Xinjiang	0.08	Hainan	0.06	Guizhou	0.02	Chongqing	0.12
Xinjiang	0.03	Qinghai	0.07	Ningxia	0.06	Qinghai	0.01	Shanxi	0.11
Qinghai	0.02	Heilongjiang	0.07	Gansu	0.05	Ningxia	0.01	Ningxia	0.10
Ningxia	0.02	Ningxia	0.07	Qinghai	0.03	Gansu	0.00	Hainan	0.08

Note: The scores for each index in Table 4 are ranked from highest to lowest

#### 4. Conclusion and Recommendations

Based on the concept of high-quality development, this paper has developed an evaluation index system to assess the high-quality tourism development level across 30 provinces in China from 2012 to 2022. The analysis indicates that from 2014 to 2019, the tourism industry's high-quality development exhibited a generally positive trend. However, in 2020, the industry experienced a

decline due to the pandemic, followed by a gradual recovery as the pandemic was brought under control. Despite this, the overall quality of China's tourism industry remains at a medium to lower level, with significant regional disparities, particularly in areas that are categorized as low to medium development levels. This suggests that there is substantial potential for enhancing the quality of tourism development in China. Consequently, this paper proposes the following strategies to foster the high-quality development of the tourism sector.

Firstly, enhance environmental protection consciousness. Tourism environmental protection is an essential component of tourism development. It is imperative that during the development of tourist attractions, all parties involved strictly adhere to legal and regulatory standards to prevent environmental degradation caused by indiscriminate construction trends. Additionally, there should be an emphasis on educating the public about tourism environmental protection, ensuring that tourists, consumers, tourism professionals, and local residents are well-informed. Secondly, integrate tourism resources to elevate tourism quality. A deep exploration of local cultural resources should be undertaken to create distinctive tourism products. For instance, blending folk culture with historical sites could yield unique cultural tourism itineraries and experiential projects. The focus should be on enhancing the quality and depth of tourism products, aiming to develop premium tourism offerings. Innovation in tourism products should be fostered, with the goal of establishing a number of renowned tourism product brands. There should be a concerted effort to integrate and promote provincial tourism resources, highlighting local attractions while preserving their unique characteristics.

Thirdly, prioritize the improvement of tourism infrastructure. Increased investment in tourism infrastructure is necessary to enhance the accessibility and convenience of tourist destinations. This could include upgrading transportation networks and road infrastructure within scenic areas, as well as improving the quality of public service facilities. Furthermore, there should be a focus on advancing tourism-related information technology to facilitate the growth of smart tourism. Leveraging advanced technologies such as big data, cloud computing, and the Internet of Things can significantly enhance tourism management and service quality.

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