

Original Paper

The Impact of Internet Penetration on Chinese Inbound Tourism Economy: An "Internet + Tourism" Perspective

Yiting Jiang¹ & Bing Li^{1,2}

¹ School of Management, University of Shanghai for Science and Technology, Shanghai, China

² Financial Research Center, Fudan University, Shanghai, China

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Abstract

Inbound tourism serves as a core carrier for cross-cultural communication and plays a pivotal role in promoting international cultural exchange. However, the development of Chinese inbound tourism market still possesses substantial potential for growth. Based on the panel data of 31 provinces in China from 2000 to 2019, this paper empirically analyzes the impact of internet penetration on the inbound tourism economy, and further examines regional heterogeneity across the eastern, central and western China. The empirical results demonstrate that internet penetration exerts a significant positive effect on the development of the inbound tourism economy. Furthermore, this promotion effect exhibits distinct regional disparities, characterized by a step-wise pattern where the impact in the central region is slightly higher than in the eastern region, and significantly higher than in the western region.

Keywords

Inbound Tourism Economic, Internet Penetration, Digital Economy, Regional Heterogeneity

1. Introduction

Inbound tourism economy is an important indicator of the overall competitiveness and international position of the tourism industry in a country or a region. Since China's accession to the World Trade Organization (WTO) in 2001, the inbound and outbound tourism markets have been gradually liberalized, attracting increasing international tourists and providing a solid foundation for the long-term development of China's inbound tourism industry.

The continuous penetration and deep integration of Internet technologies into the tourism sector have given rise to a plethora of emerging platforms, including online travel agencies, social media, and travel live-streaming services. These platforms have fundamentally transformed the ways in which international visitors access travel information, plan their itineraries, and make consumption decisions.

The internet-based model of information acquisition and interactive engagement endows tourism information dissemination with greater immediacy, interactivity, and personalization. As a result, it poses new challenges and puts forward higher requirements for Chinese inbound tourism promotion strategies, product development and service quality. Nowadays, global marketing strategies are undergoing a major transformation, shifting from conventional approaches to those heavily reliant on Internet-based marketing (Li et al., 2023). According to data released by the Ministry of Culture and Tourism of the People's Republic of China, the number of tourists visiting China in 2025 reached 154.5 million, and total tourist spending amounted to 131.1 billion U.S. dollars. This shows that spending per tourist has increased significantly and reflects the strong growth of the country's tourism market as a whole.

According to statistics from the China Tourism Research Institute, the share of revenue from inbound tourism in China's GDP is less than 0.5 percent, which is significantly lower than that of developed countries. If this share could be increased by one percentage point, it would contribute at least 1,300 billion yuan to China's GDP. This simple fact shows that China has enormous potential in the field of inbound tourism. In response to this situation, ten departments including the Ministry of Culture and Tourism have jointly issued the "Opinions on Deepening 'Internet + Tourism' to Promote the High-quality Development of Tourism", which encourages the development of emerging formats such as cloud tourism and cloud live streaming, and promotes the in-depth integration of online tourism platforms with the real economy. It can thus be seen that studying the development of inbound tourism under the current background carries great practical significance. Such research helps guide relevant policy-making and practical practices, and promotes the sustainable development of Chinese inbound tourism.

2. Literature Review

As a sector attracting widespread attention and strong support from governments worldwide, inbound tourism has become a core research focus in the field of tourism both domestically and internationally. From a macro perspective, existing studies have quantitatively analyzed the factors influencing the development of inbound tourism across multiple dimensions, including economic development (Cortes-Jimenez & Pulina, 2010), industrial structure (Zhang, 2025), opening to the outside world (Uzar & Yılmaz, 2025), tourism cultural resources (Qiang et al., 2018) and seasonal climate (Wu et al., 2023). These factors enrich the theoretical system of inbound tourism economic development and provide a scientific basis for policy formulation and industrial planning. Furthermore, the digital economy exerts a sustained and significant impact on tourism innovation, particularly during the transformation of China's tourism industry (Yang & Yue, 2024).

As the core carrier of digital technology, the Internet is infiltrating all levels of the tourism industry with unprecedented depth and breadth, and has become a key driver of industrial transformation. Currently, the digital transformation of the tourism industry is accelerating, and the application of

information technology in tourism informatics is deepening (Wei et al., 2024). This development not only reshapes the operation mode of the tourism industry but also affects the way consumers acquire and consume tourism services, giving birth to the concept of 'e-tourism' (Lama et al., 2020; Li et al., 2023). Specifically, Internet tools represented by online travel platforms, mobile applications, social media, big data analysis, artificial intelligence recommendation systems, and VR and AR technologies (Suanpang & Pothipassa, 2024) have been widely used in many scenarios including information acquisition, itinerary planning, online booking, intelligent navigation, user-generated content sharing, personalized recommendation and destination intelligent management (Hamid et al., 2021).

At the same time, the Internet and information technology play a key role in the operation, structure and strategy of inbound tourism and promote global communication among suppliers, consumers and intermediaries. Nowadays, social media has become an important platform for tourists to search for and share tourism-related content, and it is also one of the key sources of information for travel planning. IoT technology in smart tourism aims to improve operational efficiency and enrich the traveler experience. Big data and artificial intelligence algorithms also enable intelligent tourism services and products that center on customer experience. For example, an intelligent platform that combines generative AI, natural language processing, and IoT supports tourism decision-making and itinerary planning for smart tourism destinations (Suanpang & Pothipassa, 2024), which improves consumer satisfaction while enabling the delivery of personalized recommendations.

Based on the literature reviewed above, most scholars have analyzed the influencing factors of international tourism receipts. At the same time, some researchers have focused on the role of the integration of Internet technology and tourism in the development of the tourism sector. However, there is still a lack of research on the impact of network factors on the domestic inbound tourism market. This paper takes the degree of network popularization as the main predictor variable, examines its impact on Chinese inbound tourism economy, and further conducts an empirical test covering the eastern, central and western regions of China. The study aims to reveal the similarities and differences in how regional informatization levels affect the inbound tourism economy across different parts of China. Among these sections, the classification of Chinese regional provinces follows the standards issued by the National Bureau of Statistics.

3. Research design

3.1 Sample Selection and Data Sources

Based on data availability, the paper constructs a balanced panel data comprising 31 provincial-level administrative regions in China for the period from 2000 to 2019. Data on international tourism receipts and the number of Internet users are obtained from the CSMAR database and the China Statistical Yearbook published by the National Bureau of Statistics of China. Other relevant control variables are compiled from multiple sources, including the China Statistical Yearbook (2001–2020 editions), the China Tourism Statistical Yearbook (2001–2018 editions), the China Culture and Tourism

Statistical Yearbook (2019 edition), the China Cultural Heritage and Tourism Statistical Yearbook (2020 edition), various provincial statistical yearbooks (2001-2020 editions) released by local statistical bureaus, the CSMAR database and the official website of the Ministry of Culture and Tourism of the People's Republic of China.

Due to the different methodology used to distinguish tourists when calculating tourism revenue from foreign exchange, this article has excluded these regions. Furthermore, the disruption in China's domestic tourism sector in 2020 is attributed largely to travel restrictions introduced in the wake of the COVID-19 pandemic. To prevent potential distortions and ensure the reliability of the results, this paper excluded outliers from that period.

3.2 Variable Definition

3.2.1 Dependent Variable

The paper adopts international tourism receipts as the dependent variable. This figure includes the total spending by foreign tourists on goods and services, including spending by tourists from abroad, Chinese nationals living overseas, and residents during their trips to many provinces in China. As a comprehensive indicator, it not only reflects the vitality and prosperity of a region's tourism industry but also serves as a key symbol of that region's international tourism competitiveness and cultural soft power. We use international tourism revenue converted using the annual exchange rate of the Chinese yuan (RMB) to eliminate distortions caused by exchange rates.

3.2.2 Predictor Variable

As the primary indicator of internet penetration, the number of Internet users reflects the scale of information infrastructure and the level of network coverage in a country or region. It also indicates the level of ICT adoption among the public. At the same time, it captures the ability of potential tourists to access destination information, make online bookings and engage with digital tourism marketing (Shariffuddin et al., 2023).

3.2.3 Control Variable

Existing academic research mainly focuses on influencing indicators such as regional industrial structure, residents' living standards, tourism resources and so on. Based on the influencing factors identified in previous studies, this paper introduces several potential determinants of the economic performance of domestic tourism, taking into account both data availability and measurability. The level of industrial structure is measured by the ratio of tertiary industry output value to regional GDP. Trade openness is measured by the ratio of total imports and exports of goods and services to GDP. Eco-climatic conditions are the natural logarithm of annual precipitation reported in the local statistical yearbooks of each province, and tourist accommodation capacity is the natural logarithm of the number of star-rated hotels in each province. Tourism resource abundance serves as the aggregate count of 5A-rated scenic spots, world cultural heritage sites, nature reserves, and museums provided by the government. Given the substantial differences in the raw data, we perform a logarithmic transformation on certain variables to eliminate the influence of differing scales and measurement units, which ensures

the reliability and comparability of empirical results.

Definitions of the specific variables are presented in Table 1, and the descriptive statistical results for each variable are shown in Table 2.

Table 1. Variable Definition

	Symbol	Variable	Explanation
Dependent variable	ITR	International tourism receipts	International tourism foreign exchange income of each province (converted by RMB exchange rate, natural logarithm)
Predictor variable	NPR	Network penetration rate	The number of Internet users in each province (natural logarithm)
Control variable	ISL	Industrial structure level	The ratio of tertiary industry output value to GDP
	TOP	Trade openness	The ratio of total import and export of goods and services to GDP
	ECC	Eco-climatic conditions	Annual precipitation in each province (natural logarithm)
	TAC	Tourist accommodation capacity	The number of star-rated hotels in each province (natural logarithm)
	TRA	Tourism resource abundance	The total number of 5A-rate scenic spots, world cultural heritage sites, nature reserves and museums in each province (natural logarithm)

Table 2. Descriptive Statistics of Variables

Variable	Count	Mean	SD	Min	Max
ITR	620	3.56	1.714	-1.565	6.916
NPR	620	6.39	1.485	1.946	8.853
ISL	620	0.43	8.915	0.30	0.77
TOP	620	0.297	0.367	0.032	1.59
ECC	620	2.872	0.271	2.221	3.379
TAC	620	2.444	0.31	1.519	3.035
TRA	620	2.123	0.343	1.279	2.761

3.3 Empirical Model

Following the preprocessing of the mentioned data, we construct an ordinary least squares (OLS)

regression model to examine the impact of network penetration rate on Chinese inbound tourism economy.

$$ITR_{i,t} = \alpha + \beta NPR_{i,t} + \gamma Control_{i,t} + Year_FE + Province_FE + \varepsilon_{i,t} \quad (1)$$

i and t denote provinces and years, respectively. ITR is the international tourism foreign exchange income of province i in year t , while the variable NPR represents the region's network penetration rate index. $Control$ refers to a series of control variables that may affect the inbound tourism economy. To effectively account for unobservable factors arising from temporal and regional variations, we also control for the time effect ($Year_FE$) and the regional effect ($Province_FE$) in the regression analysis.

$\varepsilon_{i,t}$ is the error term.

4. Regression Results and Analyses

Table 3 reports the estimation results for the relationship between network penetration rate and international tourism receipts. After progressively incorporating a set of control variables as well as time and region fixed effects into the baseline univariate regression, the findings indicate that the estimated coefficients of network penetration rate (NPR) are 0.798, 0.379, and 0.218, respectively, and all of these coefficients are statistically significant. This consistent positive association suggests that an increase in the number of Internet users across regions exerts a significant and robust promoting effect on local international tourism foreign exchange receipts. On the one hand, increased internet penetration gives potential international tourists more convenient and diversified access to travel-related information. This in turn lowers information search costs and stimulates their willingness to travel. On the other hand, it enables local tourism enterprises to strengthen online marketing strategies and drive service innovation, so as to enhance the appeal of their tourism products. These two channels jointly promote the development of the inbound tourism economy.

Table 3. Model Regression Results

	Dependent variable		
	<i>ITR</i>		
	(1)	(2)	(3)
NPR	0.798*** (23.78)	0.379*** (11.12)	0.218** (2.75)
ISL		0.017*** (3.78)	0.042*** (7.98)
TOP		1.885*** (15.20)	0.569*** (3.69)

ECC		1.278*** (9.11)	0.403* (2.40)
TAC		0.634*** (3.75)	-0.163 (-1.18)
TRA		0.974*** (6.36)	0.410* (2.20)
_cons	-1.536*** (-6.98)	-7.447*** (-16.19)	1.550 (1.88)
Year	NO	NO	YES
Province	NO	NO	YES
N	620	620	620
adj. R ²	0.4770	0.7723	0.9542
F	565.443	350.985	235.477

***, ** and * represent significance levels at 1%, 5% and 10%, respectively.

5. Regional Heterogeneity Analysis

Given the regional heterogeneity in how network penetration rates impact inbound tourism economies across different regions of China, this disparity stems from uneven development across regions in digital infrastructure, tourism resource endowments, industrial structures and degrees of economic openness. To further investigate this phenomenon, we employ dummy variable to partition the full national sample into subsamples corresponding to the eastern, central and western regions, and subsequently conduct panel data regression analyses on each group. Since direct group-wise regressions may be biased by disparities in sample sizes across groups, we apply seemingly unrelated estimation (SUE) to the regression models for the three regions. Under the assumption of correlated random error terms across equations, the original hypothesis is verified through a coefficient difference test. The empirical results indicate that the test statistics for cross-group coefficient differences reject the null hypothesis at the 1% significance level, confirming that network penetration exerts a spatially non-equilibrium effect on inbound tourism economic performance. This finding robustly supports the adoption of group-wise regression analysis in this study.

As shown in the regression results reported in Table 4, the network penetration rate (NPR) exerts a positive effect on inbound tourism receipts across the eastern, central and western regions of China. The magnitude of this promotional effect shows a distinct ladder-like spatial pattern: the influence in the central region is slightly greater than that in the eastern region, and both are significantly greater than that in the western region. It can largely be attributed to the central region's abundant endowment of historical, cultural and natural landscape resources, which remained underutilized in the past due to the dual constraints of geographical remoteness and limited transmission channels. This also results in a

significantly lower international profile for the region compared with the eastern region. The growing popularity of the Internet has greatly alleviated the information asymmetry that international tourists face. Through digital platforms including short-video applications and social media, the unique tourism resources of central regions gain broader visibility and develop strong appeal among overseas visitors. In eastern coastal areas, where Internet penetration is relatively high and digital development is comparatively mature, the marginal increase in tourism revenue generated by each additional unit of Internet penetration shows a downward trend.

Table 4. Regional Heterogeneity Analysis

	Dependent variable		
	<i>ITR</i>		
	(1)	(2)	(3)
NPR_East	0.503*** (16.46)		
NPR_Mid		0.561*** (9.34)	
NPR_West			0.266*** (5.30)
ISL	-0.042*** (-6.58)	-0.056*** (-5.18)	-0.031** (-3.07)
TOP	0.089** (0.67)	-2.493 (-1.86)	0.644* (0.94)
ECC	0.126* (0.65)	0.857** (2.52)	0.334 (1.04)
TAC	0.082 (0.52)	-0.350 (-0.91)	-0.673** (-2.76)
TRA	0.284 (1.47)	1.279** (2.98)	2.293*** (5.33)
_cons	0.724*** (0.89)	-0.822 (-0.47)	-2.542* (-1.97)
Year	YES	YES	YES
Province	YES	YES	YES
N	260	120	240
adj. R ²	0.9464	0.8587	0.9272
F	255.137	66.754	179.990

***, ** and * represent significance levels at 1%, 5% and 10%, respectively.

In contrast, the western region maintains a relatively low level of network penetration. Although network communication still has a positive effect on inbound tourism foreign receipts in these areas, its promotional impact is considerably weaker than that observed in the central and eastern regions. Firstly, network infrastructure remains underdeveloped in some remote tourist destinations in the western region, thereby constraining both the efficiency and coverage of information transmission as well as the digital promotion of distinctive local tourism resources. Secondly, there is a gap between the western region and other regions in terms of digital talent reserve and multilingual intelligent support for cross-border tourism services, which weakens the potential source conversion capacity enabled by the internet. Furthermore, the overall development level and degree of internationalization of the tourism industry in the western region are relatively low. Although the growing popularity of digital networks has boosted the visibility of regional tourism, the responsiveness of the inbound tourism economy to this online prominence remains constrained by inadequate transportation infrastructure and insufficient ancillary service facilities. Such inter-regional gradient difference not only reflects the regional imbalance in China's network infrastructure construction and digital economy development, but also reveals the unique opportunities and challenges that different regions face when using digital technology to promote the development of inbound tourism.

6. Conclusion

Based on the provincial panel data from 2000 to 2019, this article studies the impact of network penetration rate on Chinese inbound tourism economy, and further conducts an empirical analysis of inter-regional differences across three dimensions: the eastern, central and western regions. The research has the following findings. The network penetration rate across different regions has a significantly positive effect on local international tourism receipts. The popularization of the internet lowers the information search costs for international tourists and stimulates their willingness to undertake inbound tourism by expanding information channels and strengthening the impact of public promotion. Based on the analysis of regional heterogeneity, it is confirmed that there are significant regional differences in the impact of network penetration rate on the inbound tourism economy, which is specifically reflected in a stepwise promotion trend of "central > eastern > western". Based on the conclusions drawn from the above research, policy implications are as follows.

First, promote the construction of network infrastructure and implement differentiated network construction strategies according to the characteristics of different regions. In eastern regions, the government should focus on advancing the in-depth application of new-generation information technologies such as 5G to build a smart tourism demonstration zone. High-speed networks can be used to improve the intelligence level of tourism services. For example, they can deliver immersive tourism experiences through VR, AR and other technologies, thereby attracting more international tourists with high consumption capacity. For central regions, on the basis of consolidating existing network coverage, it is necessary to increase network investment in key tourist cities and scenic spots, and optimize

network bandwidth and stability to ensure that tourists can easily access tourism information and enjoy online services. For the western region, the government needs to increase policy support and capital investment, prioritize solving the problem of network coverage in remote tourist attractions and underdeveloped areas, and gradually narrow the digital divide between the western region and other regions.

Second, the development and promotion of tourism information platforms should be reinforced. By integrating local tourism resources, a unified and efficient international tourism information service platform can be established. Tourism enterprises and relevant authorities are encouraged to fully leverage social media, online travel platforms and other digital channels to carry out multilingual, multi-format tourism promotion campaigns. These efforts serve to showcase Chinese diverse natural landscapes, cultural heritage and distinctive folk customs, thereby enhancing the international visibility and attractiveness of Chinese tourist destinations. In particular, for the central regions where the impact of network penetration on inbound tourism is notably significant, an increased allocation of promotional resources is warranted to support the development of their distinctive tourism brands.

Third, the establishment of a regional tourism cooperation mechanism is proposed to facilitate the cross-regional sharing of tourism resources and the joint market development. The eastern region, endowed with advantages in technology, capital and managerial expertise, is well positioned to assist the central and western regions in enhancing their tourism informatization levels and service quality. In turn, the central and western regions, with their distinctive natural and cultural endowments, can complement the eastern region to jointly develop cross-regional boutique tourism routes. Furthermore, given that the network penetration rate in the western region has a relatively weaker promotional effect on the inbound tourism economy, policy-induced incentives may be considered to encourage enterprises from the eastern region to invest in the western region, so as to facilitate the digital transformation and upgrading of the tourism industry in these less developed areas.

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