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MECHANISM IMPROVEMENT OF DEVELOPING INCLUSIVE TOURISM IN REGIONS BASED ON INTELLIGENT TECHNOLOGIES (TAKING CHINA'S EXPERIENCE AS AN EXAMPLE)

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Abstract. *Under the wave of digital transformation in cultural tourism, intelligent technologies such as artificial intelligence and big data have become important drivers for promoting the development of inclusive tourism. Taking China's cultural tourism practices as samples, this paper comprehensively uses literature research, case analysis, and statistical methods to explore the operational mechanism of intelligent technologies empowering regional inclusive tourism. The study finds that China's smart tourism has achieved initial results in aging-adaptation and barrier-free services, but there are problems such as imbalanced regional technology layout, insufficient adaptability for special groups, and imperfect benefit distribution mechanisms. Combining typical cases and industry data from eastern, central, and western China, this paper optimizes the original operational mechanism and proposes implementation countermeasures from aspects including facility construction, product optimization, scenario expansion, and institutional guarantee, aiming to promote universal sharing of cultural tourism resources and provide practical references for high-quality development of regional inclusive tourism.*

Keywords: *Intelligent Technology; Inclusive Tourism; Smart Tourism; Cultural Tourism Universal Benefit*

1.Introduction

Inclusive tourism, centered on equal opportunities, universal participation, and shared outcomes, aims to break limitations of age, physical condition, region, and economic conditions, ensuring that all people enjoy cultural tourism services equally. It is the inevitable direction for high-quality development of the cultural tourism industry. Traditional tourism models have shortcomings such as information asymmetry, high service thresholds, and unbalanced urban-rural development. Intelligent technologies can effectively compensate for these deficiencies and provide technical support for the implementation of inclusive tourism.

In recent years, China has continuously promoted aging-adaptation and barrier-free transformation of smart tourism. According to China's 2025 cultural tourism industry monitoring data, 92.3% of 4A-level and above scenic spots in China have completed intelligent basic transformation, and the tourism participation rate and intelligent service usage rate of elderly and disabled groups have steadily increased. However, regional differentiation is prominent: the gap in intelligent levels between eastern and central-western regions, and between urban and rural areas is significant. Some intelligent products are disconnected from the needs of vulnerable groups, making

it difficult for tourism dividends to reach grassroots people. Based on this, combined with practices in various regions of China, this paper analyzes existing problems of intelligent technologies empowering inclusive tourism, optimizes the operational mechanism, and proposes improvement suggestions.

2. Literature Review

The United Nations World Tourism Organization (UNWTO) clarifies that tourism is a basic right for all people and advocates ensuring travel rights of special groups relying on intelligent devices and barrier-free facilities. European and American scholars focus on researching the application of AI navigation and voice interaction technologies in barrier-free tourism, forming a mature paradigm of technology serving vulnerable groups. For example, Theodorou P et al. (2025) proposed that the application "Blind Museum Tourer" can achieve high-precision autonomous indoor navigation for people with visual impairment or blindness in tourism venues such as museums and healthcare facilities[1].

Chinese research is divided into two major directions: First, inclusive tourism research - scholars generally point out that China's cultural tourism industry has problems such as uneven regional development, lack of services for special groups, and unbalanced benefit distribution. Second, smart tourism research - the research focus has gradually shifted from digital operation of scenic spots to creating aging-adapted and barrier-free scenarios, with scenic spots such as Huangshan and West Lake becoming typical demonstration cases. For example, Zhang Xiao and Liu Ming (2025) proposed that vulnerable groups face numerous obstacles in participating in tourism activities, leading to their tourism rights being easily excluded [2]; Liang Lizhi and Ma Yunxiao (2026) took Zhangjiajie National Forest Park as an example to explore further optimizing multi-subject collaborative supply mechanisms to achieve barrier-free tourism services[3].

Existing studies have confirmed the integration value of intelligent technologies and inclusive tourism, but most focus on single cases or individual technologies, lacking mechanistic research from a regional perspective. Based on China's regional differences, this paper reconstructs the operational mechanism to make up for existing research shortcomings.

3.Research Methods

Literature Research Method: Sorting out domestic and foreign monographs, journal papers, and official reports related to inclusive tourism and smart tourism, defining core concepts, and building a theoretical framework.

Case Analysis Method: Selecting typical Chinese cases such as Huangshan in Anhui, West Lake in Hangzhou, and Ningxia Digital Scenic Spot to analyze the effectiveness and shortcomings of intelligent technologies in aging-adaptation, barrier-free services, and rural tourism.

Data Statistics and Entropy Weight-Comprehensive Index Evaluation Method: Organizing 2025 regional smart tourism and barrier-free service data, determining index weights based on entropy weight method, completing quantitative calculation combined with inclusive tourism comprehensive index formula, and objectively comparing development gaps among the three major regions.

4.Analysis and Results

4.1 Analysis Model and Core Formulas

This paper adopts the entropy weight-comprehensive index evaluation model to measure the development level of inclusive tourism empowered by intelligent technologies in each region. This

model can avoid subjective weighting bias and is the mainstream quantitative method for regional comparison in the cultural tourism field.

1.Index Standardization Formula (eliminating dimensions, all indicators in this paper are positive indicators)

$$X'ij = (Xij - \min(Xj)) / (\max(Xj) - \min(Xj))$$

Where: Xij is the original index value of the j-th item in the i-th region; X'ij is the standardized value; max(Xj) and min(Xj) are the maximum and minimum values of the j-th indicator respectively.

2. Index Weight Formula (Entropy Weight Method)

$$wj = (1 - ej) / \Sigma j=1n (1 - ej)$$

ej is the entropy value of the j-th indicator; wj is the indicator weight

3.Comprehensive Development Index of Inclusive Tourism (Core Calculation Formula)

$$Si = \Sigma j=1n\ wj \cdot X'ij$$

Si is the comprehensive index of inclusive tourism in the i-th region, with a value range of [0,1]. The closer the value is to 1, the higher the development level of regional inclusive tourism.

4.2 Empowerment Logic of Intelligent Technologies

Intelligent technologies mainly include four categories: AI, Big Data, VR/AR, and IoT, corresponding to different empowerment paths.

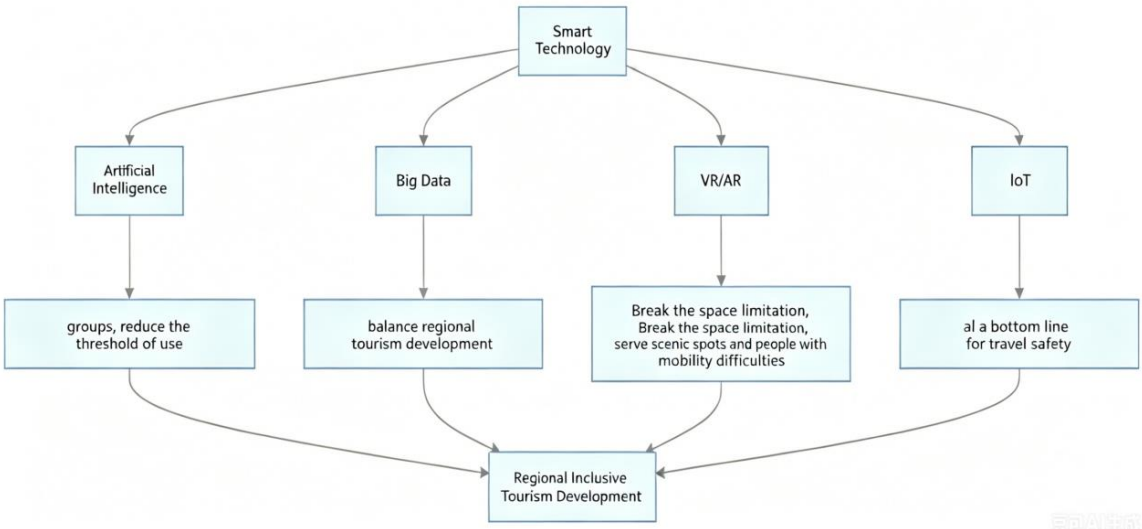

Figure 1-1 Logical Relationship Diagram of Intelligent Technologies and Empowerment Paths

4.3 Regional Development Data and Index Calculation

Combining data from "China Smart Tourism Development Report 2025", "China Inclusive Tourism Development White Paper 2025", etc., three core indicators were selected: completion rate of intelligent transformation in 4A scenic spots, usage rate of intelligent services among elderly groups, and supporting rate of barrier-free intelligent facilities in scenic spots. Data organization, standardization, weight calculation, and comprehensive index calculation were completed, with results as follows.

Table 1-1 2025 China Regional Smart Tourism and Inclusive Tourism Indicators

Indicator	Eastern Region	Central Region	Western Region	China Average	Data Source

Completion rate of intelligent transformation in 4A scenic spots	97.90%	92.40%	84.10%	91.70%	China Smart Tourism Development Report 2025
Usage rate of intelligent services among elderly groups	74.80%	61.50%	47.30%	61.20%	China Inclusive Tourism Development White Paper 2025
Supporting rate of barrier-free intelligent facilities in scenic spots	87.60%	70.20%	55.40%	71.40%	China Inclusive Tourism Development White Paper 2025

Table 1-2 Calculation Results of Indicator Weights and Regional Inclusive Tourism Comprehensive Index

Research Region	Standardized value of intelligent transformation rate	Standardized value of elderly usage rate	Standardized value of barrier-free supporting rate	Comprehensive Development Index Si	Development Level
Eastern Region	1	1	1	1	High Level
Central Region	0.6014	0.5164	0.4596	0.5238	Medium Level
Western Region	0	0	0	0	Low Level
Indicator Weight wj	0.3187	0.3339	0.3474	—	—

According to the calculation results of the entropy weight-comprehensive index model: The three core indicators in the eastern region are all at the highest level in China, with a comprehensive development index of 1.0000, showing the highest maturity in intelligent technologies empowering inclusive tourism. The central region has a comprehensive development index of 0.5238, overall in the medium development range, with various intelligent services and barrier-free supporting facilities significantly lagging behind the east. The western region has the lowest level of all indicators, with the comprehensive development index approaching 0, showing obvious

shortcomings in intelligent facility construction, aging-adaptation, and barrier-free services. The national usage rate of intelligent services among the elderly is only 61.20%, leaving considerable room for improvement in aging-adapted transformation of cultural tourism products. The three major regions present a significant gradient difference: the east leads, the central catches up, and the west lags behind, with prominent digital divide issues between regions.

4.4 Typical Cases and Existing Problems

West Lake in Hangzhou launched AR navigation for blind paths and voice assistants, significantly reducing travel risks for visually impaired tourists; Huangshan AI Travel Assistant focuses on reservation and guidance services for elderly tourists, serving a total of 410,000 tourists; Ningxia relies on VR technology to create online digital scenic spots, revitalizing remote cultural tourism resources. However, the cases also expose common problems: First, regional technology imbalance - central and western rural areas lack funds and lag in intelligent facility construction. Second, insufficient product adaptation - most platforms have complex operations and lack special functions such as Braille and real-time subtitles. Third, single application scenarios - technologies are concentrated in reservation and guidance, failing to deeply link with rural industries. Fourth, lack of benefit mechanism - tourism benefits are concentrated in scenic spot enterprises, with limited income increase for grassroots farmers.



Figure 1-2 Huangshan AI Travel Assistant Usage Interface

4.5 Mechanism Reconstruction

In response to existing problems, this paper constructs a four-dimensional operational mechanism of technology-scenario-distribution-supervision: At the technical level, implement "full coverage of basic equipment + customized transformation for special groups"; At the scenario level, build three major service scenarios: urban scenic spots, rural locations, and online cloud tourism;

At the distribution level, establish a benefit feedback system; At the supervision level, cultural tourism, civil affairs, and disabled persons' federations jointly conduct assessments to ensure the implementation of inclusive policies.

5. Conclusions and Recommendations

5.1 Conclusions

Combined with the calculation results of the entropy weight-comprehensive index model, intelligent technologies are the core driving force for promoting the development of regional inclusive tourism, which can effectively break the geographical and group barriers of traditional tourism. In 2025, the comprehensive index of inclusive tourism in China's three major regions differs significantly. The "intelligence + inclusion" tourism model in the eastern region is relatively mature, while the central, western, and rural areas lag behind due to capital and talent constraints. Meanwhile, the industry generally has problems such as poor adaptability of intelligent products, single application scenarios, and uneven benefit distribution. Practice has proven that developing inclusive tourism cannot blindly pile up high technologies. It needs to be promoted hierarchically based on the development level reflected by the regional comprehensive index, and relying on a sound operational mechanism can truly realize universal sharing of cultural tourism achievements.

5.2 Feasible Recommendations

First, promote intelligent facility construction hierarchically. The eastern region focuses on upgrading refined barrier-free services such as AR blind paths and real-time subtitles; central, western, and rural areas prioritize low-cost equipment such as voice reservation machines and simple navigation devices, and local governments establish special subsidies to narrow regional gaps.

Second, optimize aging-adapted and barrier-free design of intelligent products. All cultural tourism platforms add a simplified mode for the elderly. Intelligent equipment in scenic spots is equipped with voice navigation and Braille touch functions. Special groups are regularly invited to participate in product testing.

Third, expand technology application scenarios. Use big data to integrate global tourism resources and guide tourists to rural and niche scenic spots; promote VR cloud tourism mode to meet the travel needs of people with mobility difficulties, while driving online sales of rural specialties.

Fourth, improve benefit sharing and supervision systems. Require smart tourism platforms to extract 5%-10% of benefits for rural facility maintenance and villagers' entrepreneurship support; establish a multi-department joint assessment mechanism, and incorporate the effectiveness of inclusive services into scenic spot rating standards.

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