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Digital Governance of Rural Tourism under the New Development Pattern: Evolution, Mechanism, and Path Optimization

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Abstract:
This paper systematically examines the evolutionary trajectory of digital governance in rural tourism, summarizing three key characteristics: the shift of technological applications from single-point breakthroughs to systemic integration, the transition of governance subjects from government-led to multi-stakeholder collaboration, and the evolution of value orientation from efficiency improvement to sustainable development. It reveals the mechanism of digital technology in reshaping production and service processes and the role of policies and standards in regulating governance boundaries. Addressing the practical challenges such as unbalanced digital infrastructure, talent shortages, data silos, and cultural-technology conflicts, the study proposes a three-dimensional optimization path: building a "cloud-edge-end" integrated infrastructure, developing a compound talent system through "attraction, cultivation, and utilization," and innovating collaborative governance mechanisms combining "data sharing, rights allocation, and cultural protection." This research constructs a theoretical-methodological-practical analytical framework, aiming to promote the upgrade of governance from tool-driven to ecosystem-driven models and provide a systematic solution for digital governance in rural tourism.

Keywords:
rural tourism; digital governance; evolutionary mechanism; path

2025 marks a critical year for comprehensively advancing rural revitalization and deepening the construction of a digital China. As an "engine industry" for rural revitalization, rural tourism, with its multiplier effect of "one industry driving multiple sectors," has become a core driver for activating rural economies and narrowing the urban-rural gap. However, traditional rural tourism faces challenges such as fragmented resources, inefficient services, and extensive governance, struggling to adapt to the requirements of "dual circulation" and high-quality development under the new development pattern. Digital governance, by integrating data resources, optimizing service processes, and reconstructing governance models, offers new momentum for rural tourism to overcome these bottlenecks. In the era of globalization and the new technological revolution, interactions among multiple stakeholders (public sectors, private sectors, etc.) within tourist destinations have become more frequent and closer, placing rural tourism under more severe tests and new challenges (Ge Jihong, 2017). How to fully enhance tourism governance effectiveness through digital technology empowerment

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remains a key issue for the sustainable and healthy development of rural tourism. The comprehensive penetration of digital technology into tourism development elements will fundamentally reshape the interactive relationships among these elements and inevitably bring about new changes in tourism governance models. However, current research in this area is insufficient. Exploring new governance models and systems from the perspective of how digital technology influences multi-stakeholder collaboration methods and paths is a future research direction. This paper attempts to conduct research from three aspects—evolutionary trajectory, functional mechanism, and path optimization—to provide a systematic solution for digital governance in rural tourism.

1.Evolutionary Trajectory and Characteristics of Digital Governance in Rural Tourism

1.1 Evolutionary Trajectory of Digital Governance in Rural Tourism

The evolution of rural tourism governance is a dynamic process deeply coupled with the stages of industrial development, where governance methods, effects, and models iterate with changing era backgrounds and demands. Given the significant changes in the concepts and interests of governance subjects in the digital age, tourism governance models are also continuously adjusting and innovating. The evolution of digital governance in rural tourism is highly synchronized with the national strategy of building a digital countryside, which can be divided into three stages:

(1) Initial stage (2018–2020): Infrastructure construction and resource digitization

The 2018 No. 1 Central Document first proposed implementing the digital countryside strategy, focusing on advancing rural broadband networks and 4G coverage to address the digital divide. During this stage, rural tourism digitization primarily focused on resource display, such as establishing rural tourism information websites and scenic area e-guidance systems, with the core goal of enhancing the accessibility of rural tourism through digital means. For example, Anji County, Zhejiang Province, took the lead in building a rural tourism resource database in 2019, integrating information on over 300 farmstays and homestays across the county to enable online querying and booking by tourists.

(2) Development stage (2021–2023): Service upgrading and smart tourism implementation

The Digital Countryside Development Action Plan (2022–2025) issued in 2021 explicitly proposed tasks for smart tourism construction, driving rural tourism to transition from information display to service optimization. During this stage, big data, AI, and other technologies were deeply applied, such as optimizing route design through analysis of tourist behavior data and enhancing scenic area safety management using intelligent monitoring systems. For instance, Zhouzhuang Town, Jiangsu Province, introduced a smart tourism platform that integrated ticket booking, traffic navigation, and emergency response into a one-stop service, increasing tourist satisfaction by 27%.

(3) Deepening stage (2024–present): Ecosystem reconstruction and multi-stakeholder collaboration

The 2025 No. 1 Central Document emphasized "promoting the deep integration of rural culture and tour-

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ism," propelling the digital governance of rural tourism toward ecological collaboration. During this stage, digital governance is no longer confined to single links but constructs an ecosystem integrating digital infrastructure, industrial integration, and community participation through collaboration among government, enterprises, villagers, and tourists. For example, Zhaoxing Dong Village in Guizhou Province, via its digital countryside governance platform, integrated tourism data, villagers' demands, and enterprise resources to achieve transparent distribution of tourism revenue and community co-construction, increasing villagers' per capita income by 40%.

1.2 Evolutionary Characteristics of Digital Governance in Rural Tourism

The evolution of digital governance in rural tourism essentially represents a transformation from "technical tools" to a "governance ecosystem."

(1) Technological applications: From single-point breakthroughs to systemic integration

Early-stage technological applications in the digital governance of rural tourism focused on resolving information asymmetry, characterized by single-point breakthroughs. From 2000 to 2015, technologies were primarily concentrated on information display and transaction links—for example, farmstays published menu and price information via simple webpages or forums, and tourists completed bookings via telephone or early OTA platforms, with technological functions covering only the "information-transaction" thread. With the popularization of 5G, IoT, AI, and other technologies, current digital governance has expanded to full-chain coverage of resource management, service optimization, and community governance. At the resource end, IoT sensors monitor the temperature, humidity, and vibration frequency of ancient buildings and ecological landscapes in real time; at the service end, AI algorithms generate customized routes such as family research tours and senior health and wellness tours based on tourist behavior data; at the community end, online discussion platforms integrate villagers' demands, enabling data to handle tasks instead of villagers having to do so. The systemic integration of technological applications has transformed rural tourism from passively adapting to demands to actively creating value.

(2) Governance subjects: From government-led to multi-stakeholder collaboration

The initial-stage governance subject structure was typified by "government leadership"—the government bore the primary investment in digital infrastructure (e.g., broadband installation, data center construction), with enterprises and villagers largely as passive recipients. For example, some rural scenic areas in Lijiang, Yunnan, built smart guidance systems in 2010, but technical maintenance and data management remained directly under government departments. Currently, governance subjects have evolved into a four-dimensional collaborative pattern of government, enterprises, villagers, and tourists: the government has shifted to being a provider of digital infrastructure; enterprises have become the main force in technological applications; villagers have transformed from service recipients to data contributors; and tourists, through behavioral data, feed back into tourism product design. This multi-stakeholder collaboration has shifted governance effectiveness from "government blood transfusion" to "multi-party blood creation."

(3) Value orientation: From efficiency improvement to sustainable development

Early-stage digital governance prioritized efficiency improvement, focusing on reducing transaction costs

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and shortening service processes. For example, online booking systems reduced intermediate links such as telephone communication and on-site confirmation, increasing transaction efficiency by 60%. However, this efficiency-first model often neglected ecological protection and cultural inheritance, even leading to digital exclusion. Currently, the value orientation has deepened toward sustainable development: at the ecological level, intelligent environmental monitoring systems provide real-time early warnings for water quality and air anomalies, shifting ecological protection from "post-event punishment" to "pre-event warning"; at the cultural level, VR/AR technologies restore intangible cultural heritage skills, avoiding physical damage while expanding cultural dissemination; at the community level, data feedback mechanisms use blockchain to record villagers' participation (e.g., cultural activities, data collection) and distribute tourism revenue based on contributions, achieving shared development outcomes. This transformation has shifted rural tourism from short-term profit-seeking to long-term symbiosis.

The evolution of digital governance in rural tourism is both an extension of technological penetration and a reconstruction of governance logic. Through the integration of technologies, collaboration among subjects, and upgrading of values, it ultimately constructs a new governance ecosystem characterized by technological empowerment, multi-stakeholder participation, and sustainable development, injecting more lasting momentum into rural revitalization.

2.Functional Mechanism of Digital Governance in Rural Tourism

2.1 Digital Technology Reconstructs Tourism Production and Service Processes

Through the deep integration of data, algorithms, and scenarios, digital technology has reshaped the core links of rural tourism.

Intelligent resource management: IoT technology enables real-time monitoring of rural tourism resources. Combined with satellite remote sensing and drone patrols, it can accurately assess resource depletion risks. For example, the Old Town of Lijiang, Yunnan, uses digital twin technology to build 3D models of ancient buildings, dynamically monitoring structural safety and reducing maintenance costs by 30%.

Personalized service experience: Big data analysis of tourist behavior, combined with AI algorithms, generates customized tourism plans. For instance, the Naked Heart Valley B&B in Moganshan, Zhejiang, uses user profile analysis to launch themed packages such as family farming and senior health and wellness, increasing repurchase rates to 65%.

Precision marketing and communication: Social media and short-video platforms have become new entry points for rural tourism. Through content marketing and traffic conversion, niche attractions can rapidly transform into internet-famous destinations. For example, Aba Prefecture, Sichuan, promoted Tibetan village culture via short videos, resulting in a 200% year-on-year increase in tourist visits in the first half of 2025.

2.2 Policies and Standards Regulate Governance Boundaries

Policies and standards are critical supports for the implementation of digital governance.

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Top-level design clarifies directions: National-level documents such as the Digital Countryside Development Strategy Outline and Guidelines for Smart Tourism Scenic Area Construction define the goals and paths for rural tourism digitization; local governments have digital countryside special funds and tourism data sharing rules to address core issues of "who invests" and "who benefits." For example, Qingyuan City, Guangdong, allocated 50 million yuan in special funds to support rural tourism digitization projects, attracting over 200 million yuan in social capital investment.

National standards ensure consistency: The National Standardization Administration has issued 12 special standards, including the Evaluation Specifications for Model Rural Tourism Villages and Quality Requirements for Smart Tourism Services, while localities have formulated over 300 detailed rules (e.g., Zhejiang's Digital Service Specifications for Rural Homestays), ensuring consistency in technological applications and service quality.

3.Practical Challenges and Path Optimization for Digital Governance in Rural Tourism

3.1 Practical Challenges

Despite the phased progress in digital governance of rural tourism, its deepening implementation still faces systemic bottlenecks in "technology, talent, and mechanisms," alongside value conflicts between culture and technology, manifesting in four key areas:

(1)Unbalanced digital infrastructure

The regional gap and functional shortcomings in digital infrastructure are primary barriers to digital governance. In terms of regional distribution, eastern developed regions, supported by strong fiscal capacity, have achieved over 80% 5G coverage, with key rural tourism areas basically realizing "5G + fiber" dual-gigabit coverage; in contrast, underdeveloped central and western regions, constrained by geographical conditions and funding, have only 40% 5G coverage, with some remote villages still relying on 4G networks. This disparity directly leads to difficulties in deploying smart devices: a Miao village in Guizhou introduced an AR guidance system but experienced high network latency, requiring tourists to wait over 30 seconds for loading after scanning, significantly reducing experience quality; a Tibetan area in Sichuan attempted to promote unmanned vending machines but faced unstable networks (2–3 daily outages), resulting in a 40% failure rate for transactions, ultimately forcing discontinuation. Functionally, existing infrastructure focuses on "connectivity" (e.g., broadband, base stations) while lacking "computation" (edge computing nodes) and "storage" (local data centers) capabilities, causing real-time data processing (e.g., tourist flow early warnings) to rely on cloud services and reducing response efficiency (e.g., a scenic area's peak-hour tourist flow analysis was delayed by 1 hour, missing the golden period for emergency response).

(2)Shortage of compound talent

Rural areas face a severe shortage of compound talent proficient in both tourism and digital technology, resulting in a dual dilemma of "inability to attract external talent" and "inability to cultivate local talent." On

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the one hand, college graduates in "digital tourism" (e.g., tourism big data analysis, smart scenic area management) prefer to join urban cultural tourism enterprises or internet companies, as rural areas struggle to attract high-end talent due to lower salaries (30–40% lower than urban averages) and limited development opportunities. On the other hand, local practitioners (mostly villagers or returning youth) generally have low digital literacy—according to a 2024 survey by the Ministry of Agriculture and Rural Affairs, only 15% of rural tourism practitioners can proficiently use basic data analysis tools (e.g., Excel, BI software), and over 60% are "unfamiliar" with technologies like AI recommendations and IoT monitoring. This capability gap leads to widespread "emphasis on construction, neglect of operation": a central scenic area invested 2 million yuan in a smart management platform, but staff could not operate data dashboards or interpret tourist portraits, reducing the platform to a "data display screen"; a western B&B introduced a smart guest control system (voice temperature adjustment, light control), but villagers' lack of maintenance skills led to a 50% equipment failure rate, ultimately forcing a return to traditional manual operations.

(3)Absence of data sharing mechanisms

Government, enterprise, and villager data are distributed across different platforms (e.g., government systems, enterprise private clouds), lacking unified sharing standards and incentive mechanisms, leading to a "data silo" dilemma. First, unclear data ownership: the ownership, usage rights, and revenue rights of tourist behavior data (collected by enterprises), resource monitoring data (collected by the government), and cultural story data (collected by villagers) are undefined, causing enterprises to resist sharing due to "data leakage" concerns, the government to restrict access due to "privacy risks," and villagers to lack participation motivation due to weak "data value perception." Second, absent interest distribution mechanisms: an eastern rural tourism area once attempted to build a data sharing platform, but enterprises were charged interface fees for uploading tourist consumption data, the government required data desensitization before use, and villagers received no revenue share for contributing cultural data, resulting in the platform covering only 30% of enterprise data and a villager participation rate of less than 10%. This "silo effect" directly impacts governance effectiveness: scenic areas cannot integrate tourist flow, consumption preferences, and resource capacity data, making dynamic operational adjustments difficult; the government lacks real-time enterprise operation data, leading to policy formulation that often deviates from actual needs (e.g., a county issued subsidies based on "historical data" but failed to cover emerging "camping economy" formats).

(4)Conflicts between culture and technology

Excessive digitization may erode the "authenticity" of rural areas, triggering conflicts between cultural values and technological applications. On the one hand, some villages "digitize and perform" traditional folk activities to attract tourists—for example, a minority village simplified its century-old Torch Festival ceremony into a "light show + short-video live broadcast," losing the cultural core of villagers' spontaneous participation and ritual blessings; an intangible cultural heritage bamboo weaving teaching was replaced with a "VR virtual experience," where tourists could only "click the screen" to complete operations, unable to feel the texture of bamboo strips or the warmth of handcrafting, reducing cultural inheritance to a formality. On the other hand, technological applications may exacerbate "participation alienation": smart systems are more suited to young tourists' needs, marginalizing elderly villagers due to the "digital divide" (e.g., 90% of homestay orders in a village are completed via online platforms, causing villagers over 60 to lose their traditional role

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of "receiving tourists and explaining culture" due to inability to use mobile phones); data collection focuses on quantifiable economic indicators (e.g., tourist consumption, stay duration), neglecting unquantifiable cultural emotions (e.g., villagers' sense of identity with their homeland), leading to governance that "prioritizes data over emotion" and weakens community cohesion.

3.2Path Optimization

To address the practical challenges in digital governance of rural tourism, a three-dimensional collaborative strategy of "strengthening infrastructure, enhancing talent capabilities, and breaking mechanism barriers" is needed to promote deep integration of technology, society, and culture, ultimately achieving systemic improvement in governance effectiveness.

(1) Building a "cloud-edge-end" integrated network to consolidate digital infrastructure

The "cloud-edge-end" integrated layout of digital infrastructure serves as the physical foundation for digital governance, requiring efforts in both "coverage breadth" and "service depth." At the "cloud" level, provincial-level rural tourism big data centers are built to connect data barriers across tourism, agriculture, transportation, ecology, and other sectors, enabling comprehensive management via a "single screen for all regions." For example, Guizhou's "Rural Tourism Cloud Platform," completed in 2024, has integrated over 200 data items (e.g., tourist flow, homestay occupancy rates, agricultural product sales) from 80% of rural scenic areas across the province. The government can now monitor real-time issues such as "overcapacity in a scenic area" or "unsold characteristic agricultural products in a county" and coordinate with transportation departments to dispatch shuttles or commerce departments to connect with e-commerce platforms, improving decision-making response efficiency by 70%. At the "edge" level, to address high network latency in remote central and western regions, edge computing nodes are deployed in key rural tourism areas (e.g., small servers in Zhaoxing Dong Village, Guizhou, and Tibetan villages in Sichuan). This shifts high-frequency data processing (e.g., tourist flow analysis, emergency event warnings) from the cloud to the edge, reducing data response time from minutes to seconds (e.g., overcapacity warnings can trigger scenic area broadcasts and managers' mobile alerts within 5 seconds). At the "end" level, smart terminal devices adapted to rural scenarios are promoted to cover the full range of tourist activities ("food, accommodation, transportation, sightseeing, shopping, and entertainment"). Examples include developing dialect-based smart customer service (e.g., "Miao + Mandarin" dual-mode guidance robots in Xiangxi, Hunan) to address operational difficulties for elderly tourists; deploying solar-powered smart guidance signs to provide AR-based real-scene explanations even in areas without grid coverage; and promoting lightweight unmanned vending machines to balance digitization and inclusivity.

(2) Constructing an integrated "attraction-cultivation-utilization" system for compound talent development

Talent is the core support for digital governance. A sustainable talent supply chain must be formed through "external attraction, local cultivation, and positive incentives." In the "attraction" phase, policy incentives are strengthened: Anji County, Zhejiang, launched the "Digital Tourism Talent Program," offering 100,000 yuan in housing subsidies and 50,000 yuan in start-up funds to college graduates majoring in digital technology or tourism management who sign up for 3+ years of service in rural areas, and prioritizing their inclusion in the

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"Rural Revitalization Youth Backbone" training program. In 2024, this program attracted 87 such graduates to rural areas. In the "cultivation" phase, innovative "government-enterprise-university" joint training models are developed: Dayi County, Sichuan, collaborated with the University of Electronic Science and Technology of China and Douyin Group to launch a "Rural Tourism Digitization Training Camp," covering courses such as short-video operation, smart scenic area management, and smart device maintenance. Delivered through a combination of theoretical lectures and on-site practice, this camp trained over 2,000 villagers in 2024, with 30% emerging as "digital experts." In the "utilization" phase, a "digital contribution" incentive mechanism is established: Shuanglang Town, Dali, Yunnan, launched the "Rural Digital Star" selection, awarding 500–2,000 yuan and "Honorary Villager" titles to villagers who excel in data collection accuracy or cultural digital dissemination. This increased villagers' data reporting rate from 40% to 85% in 2024.

(3) Innovating collaborative governance mechanisms combining "data sharing, rights allocation, and cultural protection"

Mechanism innovation is key to breaking through the "technology-society-culture" bottlenecks, requiring a closed-loop system centered on data circulation, interest sharing, and cultural inheritance. For data sharing mechanisms, a series of Rural Tourism Data Sharing Management Measures are formulated to clarify the ownership, usage rights, and rules for government, enterprise, and villager data. A "data bank" is used to ensure secure data circulation and value transformation: The pilot "Tourism Data Sharing Platform" in Tongli Town, Jiangsu, allows enterprises to exchange uploaded tourist consumption data for government traffic subsidies, and villagers to earn "data credits" (redeemable for scenic area tickets or agricultural products) by contributing intangible cultural heritage craft videos. After six months of operation, the platform has aggregated over 5 million data entries, improving enterprise operational efficiency by 40%. For rights allocation mechanisms, blockchain technology is used to establish a transparent distribution system that converts villagers' "data contribution" and "service participation" into credits, with tourism revenue distributed proportionally. In Zhaoxing Dong Village, Guizhou, this system allocated 15% of total tourism revenue as data dividends to villagers in 2024, increasing the annual income of culturally active villagers by 8,000 yuan and achieving a satisfaction rate of 92%. For cultural protection mechanisms, a "digital cultural heritage database" is established, and "cultural authenticity evaluation standards" are formulated to restrict excessive digital transformation: The Taoxichuan Scenic Area in Jingdezhen, Jiangxi, mandates that tourists must complete 3 physical steps (e.g., clay modeling, glazing) when experiencing porcelain making, with VR virtual experiences serving only as supplements. This protects skill inheritance while enhancing tourist engagement.

4.Conclusions and Prospects

Under the new development pattern, digital governance of rural tourism is a critical driver for advancing rural revitalization. By clarifying evolutionary characteristics, revealing the mechanisms of digital empowerment, constructing governance systems, and optimizing implementation paths, this study establishes a complete theoretical-methodological-practical analytical framework. The three-dimensional collaborative strategy of "infrastructure-talent-mechanism" not only addresses the practical bottlenecks of technology, talent, and mechanisms through strengthened physical foundations, activated talent potential, and innovative institutional guarantees but also balances cultural protection and technological application. This promotes the upgrade of

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digital governance in rural tourism from tool-driven to ecosystem-driven models, injecting lasting momentum into rural revitalization. In the future, with the deepening application of technologies such as the metaverse and AI large models, digital governance of rural tourism will evolve toward "immersive experiences," "autonomous decision-making," and "holistic collaboration," ultimately achieving the goal of co-construction, co-governance, and co-sharing between hosts and guests.

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