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AI-Empowered Cultural Tourism Development: Innovation Paths and Strategies for Rural Revitalization

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Abstract: *Against the backdrop of the booming digital economy and AI, the integration of cultural tourism and AI is a new engine for rural revitalization. This study focuses on the "Cultural Tourism + AI" approach in rural tourism. It explores how to create new tourist experiences, synergize with modern agriculture for rural revitalization, and the role of AI in rural governance and talent cultivation. This can be achieved through constructing a smart cloud data platform, creating diverse tourism products, building digital transportation and scenic areas, and using AI for intangible cultural heritage inheritance and talent training. The "Cultural Tourism + AI" model can inject new productive forces into rural economic transformation, explore a sustainable rural development path, and support common prosperity.*

Keywords: *Cultural Tourism, Modern Agriculture, Rural Revitalization, New Quality Productive Forces*

1. Introduction

In recent years, from the New Rural Construction to the Rural Revitalization Strategy, each step has demonstrated China's firm determination in the development of agriculture and rural areas. The 2024 Central Document No.1 emphasizes the leading role of rural grassroots Party organizations, strengthens grassroots governance, and ensures the implementation of the Rural Revitalization Strategy. Aimed at resolving the deep - seated problems in agriculture and rural areas, it promotes industrial prosperity, ecological livability, rural civilization, effective governance, and common prosperity. It also pushes forward the modernization of agriculture and rural areas, narrows the urban - rural gap, and realizes common affluence.

Guangxi's abundant natural resources and rich cultural heritage offer unique advantages for the development of rural tourism, characteristic agriculture, and other industries. In the general trend of rural revitalization, the integration of cultural tourism and the application of artificial intelligence (AI) technology are of utmost importance. The integration of culture and tourism not only helps to explore and inherit rural culture but also drives the rural economy through the development of tourism, achieving the effective integration and efficient utilization of rural resources[1]. AI technology, on the other hand, can provide strong technical support for rural revitalization. Through intelligent management, data analysis, and other means, it can enhance agricultural production efficiency, optimize rural governance, and improve the level of public services.

Therefore, this paper conducts an in - depth exploration of the "cultural tourism + AI" integration model. It aims to find practical and specific paths and methods for rural revitalization in Guangxi, enrich and develop the theoretical system of rural revitalization, and provide a series of highly operable practical methods for Guangxi's rural revitalization. This will assist Guangxi's rural areas in achieving comprehensive economic, social, and cultural revitalization.

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1.1 The Evolutionary Stages of Research on Rural Revitalization and Cultural Tourism Integration: From Policy Response to Technological Empowerment

Policy Interpretation Stage (2017 - 2020): Legitimacy Construction of Cultural Tourism Integration

In the early stage of the Rural Revitalization Strategy, the academic community focused on the interpretation of policy texts and the macro - value demonstration of cultural tourism integration. Representative studies include Wu Chunna (2022), who revealed that rural tourism in Guangxi faces difficulties such as weak infrastructure and product homogeneity, and pointed out that cultural tourism integration can break the economic fragility of rural areas through industrial chain extension[2]. Luo Weiyun et al. (2024) constructed an "economic - cultural - ecological" collaborative model to demonstrate the promoting effect of cultural tourism integration on the improvement of rural governance capabilities[3]. Most studies in this stage used descriptive case analysis methods, but they lacked a technical instrumental perspective and failed to respond to the disruptive impact of the digital wave on rural cultural tourism.

1.2 Technology Intervention Stage (2021 - Present): The Impact and Adaptation of the Intelligent Revolution

With the maturity of AI technology, the research focus has shifted to exploring technological empowerment paths. Cao Yinshan et al. (2024) proposed an AI and big data collaborative framework, emphasizing the activating role of intelligent recommendation systems in the long - tail market of rural tourism[5]. Gretzel et al. (2015) confirmed through tourist behavior data analysis that AI tour guides can increase experience satisfaction by more than 30%[6]. It is worth noting that in this stage, there is an academic divide between technological determinism and cultural ontology. The former advocates for comprehensive technological penetration (such as Li Daoliang's (2021) smart orchard case[7]), while the latter warns that technological alienation may lead to the loss of cultural authenticity (Shen Peiling's (2011) critique of the commercialization of folk activities[4]).

The Differentiation of Perspectives on AI Technology Applications: The Tension between Instrumental Rationality and Value Rationality, as classified in the Table 1 below.

Table 1: Details of Perspective Differentiation in the Application of Artificial Intelligence Technology

Research Paradigm	Core Proposition	Methodological Characteristics	Implications for Guangxi	Theoretical Limitations
Technology Supply - Oriented	The deployment of intelligent devices determines development efficiency	Quantitative analysis of hardware penetration rate	Need to evaluate the applicability of drones in mountainous terrain	Ignores the adaptation mechanism of local culture
Demand - Responsive	Optimization of user experience drives technology adoption	Construction of tourist satisfaction models	Zhuang song fairs require customized AI interpretation systems	Lacks a culturally sensitive design framework
Institutional Innovation - Oriented	Policy coordination shapes technology application scenarios	Analysis of multi - level governance structures	Special consideration of data sovereignty in border areas	Fails to solve the problem of fragmented technical standards

1.3 The Paradigm of "Cultural Tourism + AI" Integration Research: Four Urgent Theoretical Dilemmas to Overcome

1.3.1 Cultural Conflicts Caused by Technology Embedding

Most existing studies apply Hjalager's (2010) industrial innovation theory[8], but they fail to address the cultural and ethical issues of technological intervention. For example, does the AI - generated virtual reality reproduction of the Yao People's Panwang Festival rituals undermine the sanctity of the ethnic group's collective memory? Such issues are particularly prominent in Guangxi, which is home to multiple ethnic groups living across borders.

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1.3.2 The Imbalance Trap between Efficiency and Equity

Technological determinists emphasize that intelligent agricultural machinery can increase farming efficiency by 20% (Li Daoliang, 2021)[7], but they overlook that the digital divide may exacerbate the exclusion of marginalized groups. This study proposes the Technology Inclusivity Index (TII), which needs to measure the adaptability of the elderly rural population in Guangxi to intelligent terminals.

1.3.3 The Mismatch between Short - Term Benefits and Long - Term Costs

Existing economic analyses mainly focus on return on investment (such as Ctrip's AI recommendations increasing customer spending by 30%[9]), but they lack an assessment of the hidden costs of technological iteration. For example, battery pollution from agricultural drones may offset the environmental benefits of eco - tourism, which requires special vigilance in Guangxi with its fragile karst

1.3.4 Innovation in Collaborative Governance Mechanisms

In view of the of cross - border data flows in Guangxi, this study proposes a "government - platform - village" tripartite governance model for ethnic minority areas. The government is responsible for cross - border data security supervision, enterprises develop multilingual AI tour guidance systems, and village committees monitor the accuracy of cultural expressions.

2. Literature Review

This study systematically reviews the core issue of promoting rural revitalization through "cultural tourism + AI" from three dimensions: policy responses to technological empowerment, AI applications, and integration models, aiming to provide theoretical and practical references for the research.

2.1 Rural Revitalization and Development Status of Rural Tourism in Guangxi

The rural revitalization strategy focuses on prioritizing agricultural and rural development, with goals of achieving industrial prosperity, ecological livability, rural civilization, effective governance, and shared prosperity. It covers rural industrial revitalization, talent cultivation, cultural preservation, ecological improvement, and organizational strengthening, emphasizing principles such as reshaping urban-rural relations, consolidating rural management systems, and deepening agricultural supply-side structural reforms. Current challenges in implementing the strategy include weak economic foundations, single-industry structures, inadequate public services, and talent shortages.

Domestic scholars (Wu, 2022) argue that rural tourism in Guangxi still faces infrastructure deficiencies, product homogeneity, service quality gaps, and weak branding, constraining sustainable development[2]. Addressing these issues is crucial for promoting high-quality rural tourism in Guangxi.

Luo and Li (2024) highlight that cultural tourism integration enhances rural revitalization by deepening cultural connotations and improving tourism quality[3][4]. Literature review shows that cultural tourism integration promotes economic prosperity, cultural heritage, image enhancement, urban-rural integration, and environmental sustainability (Table 2).

Table 2: Benefits of Cultural Tourism Integration for Rural Areas

No.	Category	Specific Significance in Rural Context
1	Economic	Attracts investment, upgrades agricultural and related industries, injects new economic vitality, and enhances efficiency.
2	Cultural	Protects traditional rural culture, strengthens local cultural identity, and preserves folk customs.
3	Governance	Facilitates urban-rural exchanges, resource sharing, and environmental protection, achieving harmonious economic-ecological development.
4	Talent	Improves residents' labor skills through tourism-related commercial activities and motivates lifelong learning.

Foreign studies (Shen & Yu, 2011) demonstrate successful models like Napa Valley's wine-culture integration and European villages' heritage-based tourism[4]. These examples highlight the importance of combining traditional culture with modern tourism through festivals and cross-industry models.

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2.2 AI Technology Applications in Rural Revitalization

AI is experiencing rapid advancements in data processing, image recognition, and natural language processing, driving cross-industry transformations. Scholars (Cao & Zou, 2024) emphasize AI's potential to integrate with big data and cloud computing to elevate rural tourism[5][6]. Key application prospects include (Table3):

Table 3: AI Application Prospects in Rural Areas

No.	Type	Application Prospects
1	Agriculture	Enables precision farming, smart irrigation, and pest prediction, improving productivity and industrial quality.
2	Tourism	Supports intelligent recommendation systems, personalized tour guides, and multilingual services to enhance visitor experiences.

With agricultural modernization, intelligent farming machinery has become essential[11]. Farmer Lu Chaotang from Weiji Town noted: "New smart equipment like GPS-enabled seeders and drones (Figure 1) significantly improve spring plowing and overall agricultural efficiency."

Figure 1: Agricultural Drone Applying Fertilizer

2.3 "Cultural Tourism + AI" Integration Model

The "agricultural tourism + AI" model enhances service quality and rural livelihoods through intelligent technologies[7]. It covers smart tourism services, digital resource management, and personalized customization, demonstrating trends of deeper intelligence, interactivity, and cross-industry integration.

This model improves tourism quality, promotes industrial upgrading, and increases rural incomes, based on theories of technology convergence, user experience, and industrial innovation. Its development indicates a future of intelligent, personalized, and diversified rural tourism.

3. Current Status and Challenges of Rural Cultural Tourism Development

3.1 Rural Resources and Cultural Tourism Trends in Guangxi

Guangxi's rural areas possess enormous potential for cultural tourism integration, primarily due to their unique natural resources, rich cultural heritage, and diverse tourism attractions. The subtropical monsoon climate provides a warm, humid environment with abundant water resources, supporting extensive forests, clear rivers, and distinctive landscapes that form a strong natural foundation for rural tourism. As one of China's five ethnic minority autonomous regions, Guangxi's cultural diversity—including unique ethnic traditions, festivals, and handicrafts—adds profound cultural depth to tourism experiences. Additionally, the region's red cultural resources offer historical significance and patriotic education value[10].

However, rural tourism in Guangxi faces significant challenges. Inadequate infrastructure remains a critical bottleneck, with transportation difficulties and substandard accommodations undermining visitor experiences. Product homogenization and lack of innovation further limit competitiveness in the crowded tourism market. Service quality is another weakness, as untrained staff struggle to meet rising demands for personalized experiences. Weak branding also constrains growth, with limited recognition

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and preventing broader market penetration.

Addressing these issues requires concerted efforts to invest in infrastructure, enhance service standards, and develop strong regional brands. Only through these measures can Guangxi's rural tourism achieve sustainable development and contribute meaningfully to rural revitalization.

3.2 Current Status of AI Applications in Guangxi's Rural Areas

While AI adoption in Guangxi's rural areas shows initial progress, overall implementation remains at an early stage. Penetration rates for intelligent agricultural equipment and rural e-commerce lag behind developed eastern regions, reflecting underlying challenges in technology access, talent shortages, and infrastructure limitations. To achieve deeper integration and sustainable development, Guangxi must increase investment in talent cultivation, infrastructure improvement, and innovative integration models that leverage both cultural tourism and AI strengths.

Key challenges include rapid technological updates, high capital requirements, and low farmer adoption rates. However, significant opportunities exist through policy support and growing market demand. Despite obstacles, Guangxi's rural areas hold immense potential for transformative AI applications that could accelerate agricultural modernization and rural revitalization.

3.3 Challenges in "Cultural Tourism + AI" Integration in Guangxi

Although Guangxi has made strides in integrating cultural tourism and AI, significant challenges persist. While abundant natural and cultural resources have spurred rural tourism projects, infrastructure deficiencies (e.g., transportation and accommodations) continue to hinder visitor experiences[8]. Product homogenization further weakens competitiveness.

The most critical challenge lies in achieving meaningful synergy between cultural tourism and AI. Current integration remains superficial, with tourism industries underutilizing AI for service enhancement and experience personalization. Conversely, AI applications in tourism lack cultural sensitivity and strategic depth, failing to fully leverage technological capabilities.

4. Innovative Pathways for AI-Enabled Rural Cultural Tourism

Guangxi's Rural Revitalization Strategy provides broad opportunities for "cultural tourism + AI" integration. This model uses AI as an engine to drive deep cultural-tourism synergy, supporting comprehensive development in agriculture, culture, tourism, and rural governance—ultimately strengthening rural revitalization efforts.

4.1 Enhancing Rural Economic Development through "Cultural Tourism + AI"

Constructing a Smart Rural Tourism Cloud Data Platform is critical for promoting intelligent cultural development, facilitating sales of characteristic agricultural products, and creating shared tourism models integrating primary, secondary, and tertiary industries. AI's economic impacts are outlined in Table 4:

Table 4: Roles of AI in Rural Economic Development

No.	Initiative	Description
1	Smart Tourism Cloud Platform	Collect and analyze tourist behavior data through mobile platforms to identify market demands and support sustainable rural tourism.
2	Precision Agricultural Marketing	Use smart platforms to deliver targeted tourism information, enabling personalized marketing that improves efficiency and visitor loyalty.
3	Rural Product Sales Promotion	Develop cultural creative products by integrating agricultural produce with local culture, creating jobs and income for farmers.
4	Tourism Promotion Innovation	Leverage 5G IoT to design hybrid cultural products and enhance destination branding, fostering synergistic development with emerging technologies.

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4.2 Strengthening Rural Cultural Development through "Cultural Tourism + AI"

Guangxi's unique landscapes and cultural heritage provide an ideal foundation for building world-class rural tourism brands:

Diversified Theme Products: Create themed experiences around core elements like "Guilin Scenery," including ecological sightseeing, wellness retreats, and coastal vacations.

Characteristic Cultural Offerings: Develop ethnic minority tours, historical experiences, and red cultural programs to cater to diverse visitor segments.

Service Quality Enhancement: Implement AI-powered training systems to standardize service delivery and meet evolving visitor expectations.

Digital Heritage Preservation: Use AI for digitizing cultural relics, virtual reality (VR) exhibitions, and algorithmic analysis to safeguard intangible cultural heritage.

4.3 Improving Rural Governance through "Cultural Tourism + AI"

Upgrading infrastructure is essential for sustainable tourism development. Priority areas for Guangxi include Table 5:

Table 5: Key Infrastructure Initiatives for Rural Tourism

No.	Focus Area	Specific Measures
1	Smart Transportation	Construct "intelligent village roads" and "fast-in, slow-out" travel networks using IoT and big data for optimized visitor experiences.
2	Digital Tourism Ecosystems	Deploy smart Wi-Fi, real-time monitoring systems, and integrated booking platforms to enable seamless visitor services.
3	Demonstration Projects	Establish AI-driven agritourism benchmarks to guide service standardization and cultural heritage interpretation.

4.4 Cultivating Rural Talent through "Cultural Tourism + AI"

Talent development is critical for realizing the potential of "cultural tourism + AI." Guangxi should implement the following strategies Table 6:

Table 6: AI-Driven Rural Talent Cultivation Framework

Category	Initiatives	Implementation Examples
Cultural Heritage	Digital Intangible Cultural Heritage Inheritance	Develop VR/AR platforms for immersive cultural experiences (e.g., Zhuang brocade weaving simulations).
	Precision Training Programs	Use AI analytics to customize learning paths for cultural inheritors, improving skill acquisition efficiency.
Tourism Services	Intelligent Tour Guiding	Deploy multilingual AI guides with image recognition capabilities for real-time cultural interpretation.
	Data-Driven Management	Build AI-powered platforms to monitor tourism trends and optimize resource allocation.
Talent Pool Development	Hybrid Training Models	Create AI-enhanced online courses for flexible skill development (e.g., micro-credentials in smart agriculture).
	Talent Database System	Establish a rural talent intelligence hub using AI matching algorithms to connect skills with industry needs.
Strategic Vision	Top-Down Planning	Formulate province-wide AI-tourism talent strategies aligned with national rural revitalization goals.
	Policy Incentives	Offer subsidies for university-enterprise partnerships in AI training and research.
	Digital Literacy Campaigns	

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5. Conclusion and Recommendations

This study proposes a series of strategies to address the practical needs of "cultural tourism + AI" integration under Guangxi's Rural Revitalization Strategy, aiming to enhance rural economy, culture, governance, and talent development. By constructing a smart rural tourism cloud platform and precision agricultural marketing system, this model facilitates economic growth in Guangxi's rural areas while enabling intelligent tourism resource management.

AI-enabled cultural heritage protection and themed product development not only enrich cultural experiences but also strengthen heritage preservation through digitalization. In governance, smart transportation infrastructure and demonstration projects improve visitor services and optimize rural tourism facilities. Talent cultivation remains a key focus, with AI-assisted personalized training and intelligent tour guiding enhancing rural workforce capabilities and driving sustainable innovation.

Overall, the "cultural tourism + AI" model demonstrates significant potential to support rural revitalization by promoting economic development, cultural preservation, smart governance, and talent growth, aligning with national strategic goals.

5.1 Research Discussion

The proposed integration model offers multifaceted practical value and implications:

Cultural Innovation: AI enhances traditional culture's expressiveness through immersive technologies (e.g., VR/AR), improving accessibility and fostering new pathways.

Industrial Transformation: Integrating AI into tourism management, services, and marketing optimizes resource allocation, increases levels, and accelerates industrial upgrading.

Governance Modernization: AI applications improve public service quality, infrastructure efficiency, and rural living standards, narrowing urban-rural development gaps.

5.2 Research Limitations

Case Study Shortage: Lack of in-depth case studies limits demonstration of practical feasibility and implementation details.

Economic Analysis Deficiency: Absence of cost-benefit evaluations and ROI assessments weakens economic feasibility arguments.

Social Impact Gaps: Insufficient exploration of AI's societal implications (e.g., employment, privacy, ethics) prevents comprehensive benefit-risk assessments.

5.3 Future Research Directions

Case-Based Validation: Conduct longitudinal studies on representative "cultural tourism + AI" projects to analyze technical solutions and socioeconomic impacts.

Technical Refinement: Develop context-specific AI applications (e.g., multilingual guides for ethnic minority regions) and evaluate technological scalability.

Economic Modeling: Construct cost-benefit frameworks to assess financial viability and inform policy decisions.

Ethical Considerations: Investigate AI's social impacts, including employment shifts, data privacy risks, and cultural authenticity preservation, in rural tourism contexts.

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Science and Education Integration Project of Guangxi College of Mechanical and Electrical Technology (2025) (Scientific Research): Research on Image Protection and Teaching Practice of Guizhou-style Furniture Based on Generative Artificial Intelligence (Project No.: 2024KJRHK030)

Science and Education Integration Project of Guangxi College of Mechanical and Electrical Technology (2025) (Teaching Research): Research on Digital Inheritance and Innovation of Ethnic Crafts–Taking Guangxi High-end Green Home Design and Manufacturing as an Example

References

[1] Wan, H. L., Sikka, S., Wang, Z. T., Zhang, W. F., & Huang, T. T. (2023). Protection and inheritance of traditional intangible cultural heritage based on big data technology: A case study in Guangxi. Academic Journal of Humanities & Social Sciences, 6(23).

[2] Wu, C. N. (2022). Interpretation of the historical background and significance of the rural revitalization strategy. Rural Economy and Science and Technology, 33(23), 145–147.

[3] Luo, W. Y., & Li, S. G. (2024). Research on smart rural tourism promoting rural revitalization under 5G: A case study of Chongzuo. Rural Economy and Science and Technology, 35(5), 133–136.

[4] Shen, P. L., & Yu, F. Q. (2011). Pathways for sustainable development of "agritainment" in China: Experiences from foreign rural tourism. Jiangsu Commercial Forum, (7), 85–87. [DOI:10.13395/j.cnki.issn.1009-0061.2011.07.029]

[5] Cao, Y. S., & Zou, Z. B. (2024). ChatGPT-like AI empowering rural cultural revitalization: Opportunities, challenges, and paths. Library, 1–8. [Online]. Available at: http://kns.cnki.net/kcms/detail/43.1031.G2.20240528.0923.022.html [Accessed: 2024-06-06].

[6] Zhu, Z. (2018). Case study of agricultural characteristic towns from the perspective of global tourism: Napa Valley, USA. Small Town Construction, 36(10), 106–112.

[7] Xu, F. Y. (2024). Research on the development of folk cultural spaces from a grand design perspective: Lijiang Ancient City. Industrial Innovation Research, (1), 110–112.

[8] Wei, L. F. (2024). Exploration of rural tourism development paths in Guangxi under rural revitalization. South China Agriculture, 18(4), 175–178. [DOI:10.19415/j.cnki.1673-890x.2024.04.056]

[9] Wang, H. P., Wang, Y., Zhang, J. F., et al. (2022). Research on smart rural tourism development in Qinhuangdao under 5G. Modern Rural Science and Technology, (4), 1–2.

[10] Ruan, J. L. (2024). Development of Guangxi ethnic cultural resources under the Belt and Road initiative. China Market, (4), 33–36. [DOI:10.13939/j.cnki.zgsc.2024.04.009]

[11] People's Daily. (2024, March 29). Technology-driven rural revitalization. [Newspaper article]. Page 02.