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Digital Technology-Driven Ecological Reconstruction and Innovation in the Cultural Tourism Industry: A Case Study of Yongqingfang

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Abstract: Amid rapid advances in digital technologies, the cultural tourism sector is experiencing profound ecological restructuring and innovation-driven transformation. This study investigates the digital evolution of Yongqingfang, a historic district in Guangzhou, and proposes a three-dimensional driving framework encompassing technology empowerment, content innovation, and ecological synergy. It systematically analyzes the roles of artificial intelligence, blockchain, and extended reality in enriching cultural experiences, optimizing operational efficiency, and enhancing user engagement. The results indicate that Yongqingfang has realized a value-chain upgrade—from activating cultural resources to transforming consumption models—through the development of branded intellectual property, the rise of influencer-led digital economies, and the digital expression of intangible cultural heritage. In addition, policy support and multi-stakeholder collaboration have facilitated a sustainable integration of heritage conservation, cultural communication, and economic value creation. This case offers a replicable model for the digital regeneration of historic districts and provides practical insights for the global cultural tourism industry.

Keywords: Digital Cultural Tourism; Ecological Reconstruction; Yongqingfang; Synergy Model.

1. Introduction

The digital transformation of the cultural tourism industry has become a key engine driving both economic growth and social development on a global scale. Supported by emerging technologies such as artificial intelligence, blockchain, extended reality, and the Internet of Things, the industry is transitioning from traditional resource-dependent models toward experience-oriented and data-driven ecosystems. These technologies enable the intelligent design of consumption scenarios, the digital preservation and reinterpretation of cultural heritage, and the coordination of industrial value chains. As a result, they significantly enhance resource allocation efficiency and stimulate new forms of value creation.

Despite increasing scholarly attention to digital cultural tourism, a systematic understanding remains lacking regarding how technology-driven ecological restructuring can be effectively aligned with cultural preservation, stakeholder coordination, and sustainable governance. Existing studies often focus on isolated technological applications or individual cases, with limited integration of broader ecosystem perspectives.

To address this gap, the present study examines Yongqingfang, a representative historic district in Guangzhou, China, renowned for its distinctive Lingnan architecture and rich intangible cultural heritage. Although the site has attracted substantial tourist flows, preliminary field investigations reveal several persistent challenges, including the limited use of immersive technologies, fragmented user experiences, underdeveloped brand IP systems, and the absence of integrated marketing and evaluation mechanisms.

In response, this research proposes a three-dimensional driving model—technology empowerment, content innovation, and ecological synergy—and explores its practical implementation through a multi-dimensional case study. Specifically, it investigates how AI, blockchain, and XR technologies can improve operational intelligence and immersive experiences; how influencer-driven economies and IP matrix construction can reshape consumption patterns; and how policy alignment and multi-stakeholder collaboration can support sustainable ecosystem development.

The findings not only confirm the effectiveness of the proposed framework but also offer a scalable and replicable pathway for the digital regeneration of historic districts. By combining theoretical inquiry with empirical analysis, this study seeks to contribute to both academic discourse and practical advancement in the field of digital cultural tourism.

2. Technology-Driven Enhancement of Service Efficiency and Experience in Cultural Tourism

2.1. Intelligent Decision-Making and Operational Optimization

Artificial intelligence (AI) is reshaping the managerial paradigm of the cultural tourism industry. For example, the Yabuli Ski Resort in Heilongjiang Province has deployed an AI-based monitoring system, reducing emergency response time to three minutes. After adopting an AI-powered approval system, ByteDance improved cross-departmental collaboration efficiency by 40%. Through data-driven decision-making, process automation, and optimized resource allocation, AI significantly reduces operational costs while enhancing service reliability.

2.2. Technology-Enabled Immersive Experiences

Virtual reality (VR) and augmented reality (AR) technologies break the constraints of physical space and create integrated virtual–real cultural tourism scenarios. The VR skiing experience pavilion at the Beijing Winter Olympics Village receives approximately 500 visitors per day, with a repurchase rate of up to 70%. The “Digital Dunhuang”

metaverse project at the Mogao Grottoes attracts global users through immersive virtual tours. In addition, blockchain technology has been applied to the precise distribution of cultural tourism consumption vouchers, thereby improving conversion efficiency[1].

2.3. Smart Transformation of Infrastructure

Smart tourism systems utilize technologies such as the Internet of Things (IoT) and 5G to enable intelligent navigation and resource management in scenic areas. The Rongchang District government has developed a "Digital Health and Wellness Town" that integrates traditional Chinese medicine therapies, cultural experiences, and IoT-based monitoring, significantly improving visitor satisfaction. Such technological applications not only enhance the tourist experience but also drive the transition of cultural tourism destinations from a "traffic-oriented economy" to a "retention-oriented economy."

3. Content Innovation and IP Economy Reshaping Cultural Tourism Consumption Scenarios

3.1. The Traffic Amplification Effect of the Influencer Economy

The influencer economy, driven by short-video platforms, has emerged as a new growth engine for cultural tourism. For instance, a single video by the influencer "Jiakang Ge" garnered over 100 million views, leading to a surge in search volumes for niche tourist attractions in Chongqing. In Rongchang District, the integration of the influencer "Lu'e Ge" with intangible cultural heritage (ICH) initiatives has contributed to an average annual increase of 15% in tourist arrivals. By leveraging contrast, entertainment value, and cultural embedding, influencer IPs effectively transform online traffic into tangible consumption.

3.2. Extension of Cultural Tourism Value through Film and Television IP

Film and television productions stimulate tourism development through scene reproduction and derivative consumption. The animated film *Ne Zha* significantly increased visitor numbers to Nezha-themed cultural towns in Sichuan. Jiangyou City has innovatively integrated Nezha culture with Li Bai culture, embedding them into the local cultural tourism industry and enriching tourism elements such as sightseeing, shopping, and entertainment. This comprehensive approach has substantially enhanced the visitor experience, with theme parks and cultural creative product sales exceeding RMB 1 billion.

The IP-driven model exemplified by Disney further demonstrates that continuous content innovation and immersive experiences constitute the core competitiveness of cultural tourism integration.

3.3. Digital Revitalization of Local Culture

Digital technologies have revitalized intangible cultural heritage by enabling interactive and immersive experiences. In Rongchang, traditional crafts such as Xiabu weaving and pottery-making workshops have introduced AR-based interactive teaching, increasing visitor participation by 60%. In Xi'an, the "Datang Everbright City" project brings historical scenes to life through immersive role-playing experiences, attracting more than 50,000 visitors daily.

The Sanxingdui Museum in Guanghan has actively developed digital cultural and creative products, spatial exhibitions, animation, and gaming experiences that are more accessible to the public, thereby promoting the creative transformation and innovative development of Sanxingdui cultural resources. In 2025, the museum plans to further expand cross-sector integration through themed train programs, urban pop-up stores, and game collaborations.

These practices demonstrate that the digital expression of cultural IP not only preserves traditional cultural cores but also aligns with the aesthetic preferences of younger generations.

4. Case Study: Digital Transformation and Ecological Reconstruction of Yongqingfang

4.1. Current Status and Core Challenges of Yongqingfang

Table 1. Market Survey Results of Yongqingfang

Survey Dimension	Key Indicator	Percentage/Result	Priority
Tourist Information Channels (N=285)	Social media	82.46%	Extremely high
	Recommendations from friends and family	50.18%	High
	Government and official tourism promotion	28.42%	Medium
Potential Visitor Interests (N=60)	Historical and cultural architecture	Highest interest (Rank 1)	Extremely high
	Local cuisine and snacks	Second highest (Rank 2)	High
	Traditional handicrafts	Third (Rank 3)	Medium
Service Demand (N=345)	Comfortable resting areas	80.58%	Extremely high
	Convenient transportation and transfer	64.93%	High

As a representative historic and cultural district of Xiguan in Guangzhou, Yongqingfang embodies rich intangible

cultural heritage (ICH) resources, including Lingnan arcade architecture, Cantonese opera culture, Canton embroidery, and Guangcai ceramics [2]. During the 2025 Spring Festival, the district received approximately 1.0985 million visitors. However, field research conducted in this study reveals that several challenges remain.

The survey results indicate that social media (over 82%) and word-of-mouth recommendations from friends and family (over 50%) are the primary channels through which tourists learn about Yongqingfang, highlighting the critical role of online communication and word-of-mouth effects in the contemporary cultural tourism market.

For potential visitors who are not yet familiar with Yongqingfang, their interests are highly concentrated in historical architecture, local cuisine, and traditional handicrafts. This provides clear direction for future cultural IP development and the creation of core attractions.

At the same time, visitor feedback on service quality is particularly prominent. The demand for additional comfortable resting areas exceeds 80%, while nearly 65% of respondents emphasize the need for improved transportation convenience. These factors represent critical priorities for enhancing visitor experience and satisfaction.

Despite its strengths, Yongqingfang faces notable limitations in integrating technology into traditional cultural presentation. The depth of immersive technology application remains insufficient, with most exhibitions still relying on static displays. Advanced technologies such as AI-guided navigation and virtual reality interaction have not yet been systematically implemented, resulting in limited appeal to younger visitor segments.

From a branding perspective, although the "Baota Mall" cultural and creative platform has been established, the uniqueness and extensibility of its cultural IP have not been fully realized. The absence of distinctive symbolic imagery and an integrated "content–product–service" ecosystem has constrained effective brand value transformation.

In addition, the overall visitor experience remains fragmented. There is a lack of integrated design across the entire journey—from initial awareness to consumption conversion—resulting in dispersed touchpoints and discontinuous conversion pathways. A sustainable repurchase mechanism has yet to be established.

Finally, the marketing system lacks a solid theoretical foundation. The SOSTAC strategic planning model and the PESO media integration framework have not been effectively incorporated, making it difficult to quantitatively evaluate communication performance and optimize marketing effectiveness.

4.2. Ecological Reconstruction of Yongqingfang Driven by Digital Technologies

4.2.1. Intelligent Operations and Enhancement of Immersive Experiences

To enhance interactivity and operational efficiency in cultural scenarios, an intelligent navigation system can be introduced to analyze visitor behavior data in real time. Heat map analytics can be utilized to optimize crowd flow management and resource allocation within the site. Meanwhile, blockchain technology can support digital ticket authentication and integrated point systems, thereby facilitating the digital transformation of management processes.

At the Cantonese Opera Art Museum in Yongqingfang, extended reality technologies can be applied to revitalize intangible cultural heritage displays. By installing AR interactive devices, visitors can immerse themselves in reconstructed late Qing Dynasty stage scenes through wearable equipment and experience performances by virtual opera artists.

In addition, a "Digital Canton Embroidery" workshop can employ virtual reality technologies to simulate traditional embroidery processes, enhancing visitor immersion and participation[3]. This approach effectively expands innovative pathways for ICH dissemination and the integration of culture and tourism.

4.2.2. Influencer Economy and IP Matrix Construction

First, collaborative communication between key opinion leaders and key opinion consumers should be strengthened. Local influencers with cultural relevance can be invited to produce short-video series, thereby stimulating public interest and significantly increasing topic engagement on social media platforms.

Second, a dual-brand IP strategy should be developed by strengthening the "Yongqingfang × Baota Mall" branding system. Limited-edition co-branded products that integrate traditional Guangcai patterns with contemporary trendy design (e.g., "arcade-themed blind boxes") can attract market attention and stimulate consumption. Meanwhile, digital collectibles (NFTs) themed around intangible cultural heritage can be launched on online auction platforms to precisely target younger consumer groups, achieving both cultural revitalization and value enhancement.

Third, a multi-level innovation system should be established to upgrade cultural experiences. This includes:

Deepening technological empowerment through AI navigation systems and AR-based scene reconstruction to transform static exhibitions into interactive narratives; Strengthening the IP ecosystem by integrating Lingnan architectural elements, traditional craftsmanship symbols, and local culinary stories to cultivate emotionally resonant "super cultural IPs"; Extending value chains to include derivative product development and themed spatial operations; Reconstructing the user consumption journey by integrating online and offline touchpoints via data platforms to form a closed-loop model of "attraction–experience–retention–repurchase"; Establishing a scientific marketing evaluation system using the SOSTAC framework and integrating the PESO model to enable measurable and dynamically optimized communication strategies.

4.2.3. Full-Chain Optimization of the User Journey

Focusing on deepening cultural experiences and fostering long-term user engagement, this study proposes an integrated marketing implementation framework based on the SOSTAC model (see Table 2).

This strategy systematically addresses the need to enhance cultural experience depth and extend visitor stay time, covering the entire process from brand exposure to post-purchase engagement. By integrating PESO-based multi-channel communication with scenario-based tactics such as pop-up markets and AR interactions, and supported by AI navigation systems and data monitoring, it enables both cultural value transformation and long-term user retention.

Building on this framework, a full-chain immersive consumption scenario is constructed, spanning from initial interest to long-term repurchase. Through four key technological modules—AI-driven recommendation systems,

AR-based interactive experiences, blockchain-enabled transactions, and data-driven user benefits—cultural experience and consumer behavior are deeply integrated into a closed-loop conversion system.

Table 2. Integrated Marketing Plan Based on the SOSTAC Model

Module	Core Content
Situation	Cultural experience depth needs enhancement; visitor stay duration should be extended
Objective	Increase online brand exposure; enhance user engagement and repurchase behavior
Strategy	Adopt the PESO model: paid media (e.g., targeted short-video ads), public relations (e.g., national media coverage), social media (e.g., creative challenges), owned media (e.g., membership systems)
Tactics	ICH-themed pop-up markets; AR-based treasure hunt experiences; interactive check-in reward systems
Action	Phased implementation plans; development of AI navigation systems; quarterly iteration of activities
Control	Multi-dimensional data dashboards; key indicators (cultural perception, average spending, conversion rates); A/B testing optimization

Table 3. Full-Chain Immersive Consumption Technology Deployment

Stage	Touchpoint Design	Technology Empowerment
Awareness	Short-video platform recommendations	AI-based interest targeting
Engagement	AR navigation via QR codes	LBS positioning + 3D modeling
Conversion	One-click purchase via mini-program	Blockchain-secured transactions
Repurchase	Membership rewards (e.g., exclusive experiences)	Big data analytics

4.3. Policy Coordination and Ecosystem Co-Construction

A collaborative governance mechanism involving government, enterprises, and society supports industrial value extension. At the policy level, Yongqingfang has been incorporated into a municipal cultural tourism integration demonstration program, with dedicated funding supporting smart infrastructure and ICH preservation.

At the community level, local resident participation is encouraged through cultural interpreter training programs to enhance authenticity. At the industrial level, cross-sector integration is promoted through transportation hubs and resource sharing (e.g., airport-linked benefits), as well as collaboration with higher education institutions to develop digital ICH curricula. These efforts collectively form an innovation-driven cultural tourism ecosystem[4].

4.4. Multi-Dimensional Value Transformation

Through the systematic integration of technology empowerment, content innovation, and ecological synergy, Yongqingfang has achieved a structural transformation in multiple dimensions (see Table 4).

Table 4. Multi-Dimensional Value Outcomes of the Three-Dimensional Driving Model

Dimension	Core Performance
Economic	Increased average spending; growth in secondary consumption
Cultural	Enhanced cultural soft power; international recognition of digital heritage projects
Social	Increased employment and merchant income; establishment of an organic urban renewal model

The transformation of Yongqingfang has improved the efficiency of the industrial value cycle through increased spending and expanded secondary consumption. Its cultural achievements demonstrate the successful digital expression of local heritage, while its socio-economic impacts provide a replicable model for sustainable urban governance.

Overall, this model reconstructs cultural expression, connects value chains, and innovates governance structures, achieving systematic breakthroughs in economic, cultural, and social dimensions.

Regeneration Model

In summary, the Yongqingfang case verifies a collaborative mechanism for the digital transformation of historic districts. First, digital technologies such as XR and blockchain reconstruct the expression of cultural heritage, enabling contemporary reinterpretation. Second, the IP value

circulation system establishes a “brand–product–user” closed loop. Third, policy innovation and multi-stakeholder governance ensure sustainable development by balancing heritage preservation and industrial growth.

4.5. Outcomes and Industry Implications

Through the four-dimensional integration of technology application, operational innovation, user engagement, and policy coordination, Yongqingfang has achieved a systemic transition from cultural resource activation to industrial value enhancement.

This model not only validates the effectiveness of the “technology–content–user–institution” framework in addressing challenges such as fragmented cultural presentation and weak brand extension, but also establishes a replicable paradigm for the regeneration of historic spaces. It provides a practical solution for the global cultural tourism industry, driven by both technological empowerment and institutional innovation.

5. Building a Sustainable Development Ecosystem through Policy Guidance and Industrial Chain Coordination

5.1. Policy and Institutional Innovation Driving Industrial Ecological Reconstruction

Under the guidance of national strategies, a cultural tourism policy system has been established, with flexible leave arrangements and entrepreneurship subsidy mechanisms serving as key policy instruments. These measures effectively stimulate regional market vitality, promote cross-regional collaboration in the digital cultural tourism industry, and foster the emergence of micro-vacation consumption patterns.

Local governments further strengthen institutional support for industrial innovation through targeted talent recruitment programs and entrepreneurship support initiatives, thereby providing a governance framework for the deep integration of multiple sectors.

5.2. Multi-Dimensional Industrial Chain Coordination for a Composite Value Network

The cultural tourism industry has achieved multi-dimensional integration, forming a synergistic ecosystem that combines culture, healthcare, and technology. Digital cultural tourism projects facilitate the innovative integration of traditional resources, while the development of immersive consumption scenarios and the construction of closed-loop ecological service systems signal a transition from single-site operations to a comprehensive ecosystem model.

5.3. Sustainable Ecological Development across the Full Lifecycle

The application of low-carbon technologies is deeply integrated with the requirements of cultural heritage protection, giving rise to new models such as community-based tourism. The concept of sustainability is systematically embedded throughout resource development processes, digital technology application scenarios, and collaborative governance frameworks, ensuring both ecological sustainability and the integrity of cultural heritage[5].

At the same time, digital cultural tourism must address potential systemic risks. Technology dependence may lead to the homogenization of cultural expression, thereby weakening regional cultural uniqueness. Additionally, policy barriers to cross-border data flows increase the complexity of global collaboration. The inherent tension between cultural authenticity and commercialization in IP development necessitates the establishment of a lifecycle risk management system. Furthermore, the ecological pressures generated by industrial expansion require a dynamic balance between environmental carrying capacity and cultural integrity through the application of low-carbon technologies and heritage protection mechanisms.

6. Conclusion

The case of Yongqingfang demonstrates that the core competitiveness of the digital cultural tourism industry lies in collaborative innovation driven by technology, centered on culture, and supported by ecosystem development.

Future development should focus on constructing immersive scenarios that integrate virtual and physical environments, supported by deeper technological applications, enriched cultural expression, and optimized ecosystem governance. Only through such systematic advancement can the cultural tourism industry enhance the competitiveness of its value chain and achieve sustainable development.

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