Research on Innovative Pathways for Digital Technology Empowering High-Quality Integrated Development of Culture and Tourism in Zhaoqing City

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Abstract: With the in-depth implementation of the Digital China strategy, the organic integration of digital technology with cultural and tourism convergence has become a new engine driving the high-quality development of regional cultural and tourism industries. Taking Zhaoqing City as the research subject, this paper aims to explore how to utilize digital technology to create innovative pathways for integrated cultural and tourism development. The methodology involves analyzing the characteristics of Zhaoqing's cultural and tourism resources and its current digitalization status, drawing on successful domestic cases and advanced experiences from places like Wuzhen and Nanjing, to construct innovative pathways for high-quality integrated cultural and tourism development in Zhaoqing. The conclusion posits that through strategies such as building a smart cultural and tourism platform, creating immersive experience scenarios, innovating digital cultural and tourism IP, and promoting coordinated regional development, Zhaoqing's cultural and tourism industry can be effectively propelled towards digital, intelligent, and high-quality development.

Keywords: Digital Technology; Integrated Cultural and Tourism Development; High-Quality Development; Zhaoqing City; Innovative Pathways

1. Introduction

1.1 Research Background and Significance

Currently, the digital economy is flourishing, and the Digital China strategy is profoundly the development models of various industries. As an important component of the national economy, the cultural and tourism industry's integrated development with digital technology has become an irreversible trend of the times, entering a stage of development centered on technology-driven synergy[1]. From "Internet+" to "AI+", from virtual reality to augmented reality, digital technology is permeating all aspects of the cultural and tourism industry with unprecedented breadth and depth, injecting new vitality into traditional cultural and tourism resources and creating entirely new consumption and experience models. Against this backdrop, how to leverage digital technology to overcome bottlenecks in cultural and tourism integration and cultivate new momentum has become an urgent task for exploration across regions.

As a nationally renowned historical and cultural city and an important node in the Guangdong-Hong Kong-Macao Greater Bay Area, Zhaoqing City possesses unique cultural and tourism resources, including Duan Inkstone culture, Song Dynasty culture, and diverse intangible cultural heritage. However, under traditional development models, the exploitation of Zhaoqing's cultural and tourism resources still suffers from fragmentation and homogeneity, failing to fully utilize the existing resource value[2]. The empowerment of digital technology offers new possibilities for the high-quality integrated development of culture and tourism in Zhaoqing. Through the deep integration of technology and culture, it can effectively address development challenges such as low resource conversion efficiency, monotonous experience methods, and insufficient brand influence.

The significance of this study lies in: Theoretically, by systematically and comprehensively analyzing the innovative pathways through which digital technology promotes the development of Zhaoqing's cultural and tourism industry, it enriches theoretical research on the digital transformation of related cultural and tourism industries, providing theoretical reference and guidance for integrated

cultural and tourism development in similar regions. Practically, following a problem-identification, analysis, and solution approach, it ultimately proposes targeted innovative development pathways, offering decision-making references for local governments and enterprises, assisting Zhaoqing in shaping a differentiated cultural and tourism landscape with competitive advantages within the Greater Bay Area, enhancing the competitiveness and influence of its cultural and tourism industry, and ultimately achieving the transition from a city rich in cultural and tourism resources to a powerhouse in the cultural and tourism industry[3].

1.2 Research Content and Methodology

This research focuses on the core issue of how digital technology can empower the high-quality integrated development of culture and tourism in Zhaoqing City, conducting multi-level and systematic exploration. The main research content includes: Firstly, this study will analyze the theoretical foundations and mechanisms through which digital technology empowers the integration of culture and tourism, exploring how digital technology drives the transformation and upgrading of these industries from the perspectives of production, dissemination, consumption, and other key links. Secondly, it will assess the current digitalization status and identify existing problems concerning Zhaoqing's cultural and tourism resources, while analyzing the strengths, weaknesses, opportunities, and threats in the city's cultural and tourism development, thereby laying a foundation for proposing targeted implementation pathways. Thirdly, it will summarize practical experiences of digital technology empowering the integration of culture and tourism from advanced regions both in China and internationally. Fourthly, it will propose innovative pathways suitable for Zhaoqing through which digital technology can empower high-quality integrated development of culture and tourism, including the construction of a smart cultural and tourism platform, the promotion of digital technology applications, and the improvement of smart service facilities.

This study employs a multi-method cross-validation strategy: Through literature review, consulting and synthesizing domestic and international literature, statistical data, and research reports to understand the current research status and theoretical foundations, providing solid theoretical support. Through case benchmarking, analyzing the experiences and practices of successful domestic and international cases to provide reference for proposing implementation pathways and policy recommendations. Through inductive and deductive methods, extracting systematic innovative pathways and implementation strategies.

2. Theoretical Basis and Literature Review

2.1 Definition of Core Concepts

Digital technology is a crucial driving force for the high-quality development of the cultural and tourism industry. Digital technology empowerment refers to the process of reshaping industrial value chains, innovating product and service models, and enhancing operational efficiency by leveraging new-generation information technologies such as big data, artificial intelligence, the Internet of Things, blockchain, and virtual reality[4]. In the cultural and tourism domain, digital technology empowerment manifests as the penetration and restructuring of the entire chain encompassing resource development, product innovation, service experience, and management operations. Its essence lies in unlocking greater value from cultural and tourism resources through the application of new technologies, creating new growth momentum.

High-quality integrated development of culture and tourism refers to a more advanced industrial form arising from the deep integration of cultural and tourism industries. By infusing cultural connotations and offering novel tourism experiences, it ultimately aims to enhance industrial added value and sustainable development capacity, achieving maximization of comprehensive benefits. High-quality development is reflected in multiple dimensions including industrial structure optimization, increased product added value, enhanced tourist experience, expanded brand influence, and significant socio-economic benefits.

2.2 Current Research Status Domestic and International

Scholars both domestic and international have produced rich research outcomes on digital technology empowering integrated cultural and tourism development. International research focused

earlier on the application of VR/AR technology in cultural heritage preservation and tourism experience enhancement. In recent years, the research focus has gradually shifted to the application of AI and big data in tourism behavior analysis, personalized recommendations, and intelligent decision-making.

In recent years, with the rapid development of digital technologies such as 5G, big data, and artificial intelligence in China, these technologies have permeated all aspects of the cultural and tourism industry, becoming a crucial force driving its high-quality development. Domestic scholars have conducted extensive research on this topic. 1)Policy Initiatives: In 2025, the Implementation Opinions of the General Office of the State Council on Accelerating the Cultivation and Opening of Scenarios to Promote Large-Scale Application of New Scenarios proposed exploring innovative application scenarios for technologies such as the metaverse, virtual reality, intelligent computing, and robotics in areas like office work, social interaction, consumption, and entertainment, aiming to deepen the integration of the real economy and the digital economy. Furthermore, to implement the guiding principles of the 20th National Congress of the Communist Party of China and relevant policy documents, the Action Plan for the Innovative Development of Smart Tourism was issued, emphasizing the need to promote the deep integration of the digital economy and tourism, and accelerate the innovative development of smart tourism characterized by digitalization, networking, and intelligence [5]. 2) Integration of Digital Technology and Cultural Industries: Domestic scholars generally focus on the enabling role of digital technology in the cultural and tourism industries, emphasizing that digital transformation is a core pathway for achieving high-quality development in these sectors (Zhao Lin, 2025; Du Sizheng et al., 2025). Research often concentrates on technological application scenarios such as digital tourism, virtual reality, and blockchain rights confirmation (Huang Yonglin, 2020). 3) Regional Cultural and Tourism Industry Research: Studies focusing on the Guangdong-Hong Kong-Macao Greater Bay Area have largely centered on core cities like Guangzhou and Shenzhen, while there has been insufficient attention paid to non-core cities such as Zhaoqing.

Overall, existing achievements are mostly macro-level theoretical discussions or single-case analyses, lacking systematic research on the mechanisms of cultural industries in small and medium-sized cities, and often deficient in operational design for the implementation pathways of digital technology empowerment. Building upon existing research, this study will combine Zhaoqing's regional characteristics to construct more systematic and operational pathways for digital technology empowerment.

3. Current Status of Integrated Cultural and Tourism Development and Digital Foundations in Zhaoqing City

3.1 Characteristics and Value of Zhaoqing's Cultural and Tourism Resources

Zhaoqing City is an important birthplace of Lingnan culture, possessing abundant cultural and tourism resources. Firstly, Zhaoqing has rich historical and cultural resources, including Duan Inkstone culture, Song Dynasty culture, and Bao Zheng (Lord Bao) culture. Secondly, it boasts unique natural ecological tourism resources, such as the Dinghu Mountain Scenic Area, Star Lake (Xinghu) Tourist Area, and Beiling Mountain Scenic Area. Finally, it holds precious intangible cultural heritage resources, including Duan Inkstone making techniques and Zongzi (sticky rice dumpling) wrapping techniques. These resources are characterized by diversity, distinct regional features, and high quality, providing a solid foundation for integrated cultural and tourism development.

The distribution characteristics of Zhaoqing's resources also offer significant advantages. The resources are relatively concentrated, featuring the Duanzhou District as the core, radiating to surrounding areas like Dinghu District, Gaoyao District, and Sihui City. This distribution pattern is more conducive to holistic digital development and coordinated operation. However, the current situation is that resource development remains fragmented, with insufficient effective connection and integration among various resources, making it difficult to form scale effects and brand synergy.

3.2 Current Status and Achievements of Digitalization in Zhaoqing's Cultural and Tourism Sector

In recent years, Zhaoqing City has also actively explored the digitalization process in culture and tourism, keeping pace with digital technology development and achieving a series of results.

(1) Initial Success in Building a Smart Cultural and Tourism Platform: The "Zhao Hui Wan" (Fun in

Zhaoqing) online platform, developed by Zhaoqing's cultural and tourism sector, is a smart cultural and tourism platform built on digital technology. The platform includes services such as purchasing recommendations for food and cultural creative products, guides to recent city events, recommended Zhaoqing tourism routes, and night tour recommendations. The construction of the "Zhao Hui Wan" smart tourism platform marks a crucial step in Zhaoqing's strategic layout to build a city-level smart cultural and tourism hub.

(2) Progress in Digital Marketing and Activity Innovation: The third "Zhaoqing Ring Star Lake Blue Ribbon Beer Carnival" held in August 2025, themed "Millennial Zhaoqing, Century-Old Blue Ribbon," incorporated AI digital humans and activity IP, initiating cyber-tech-led cultural and tourism activities. The event utilized robotic arms for cocktail mixing and digital human staff who, through AI perception of visitor emotions, mixed cocktails matching those emotions. The addition of digital technology increased novelty for visitors, effectively expanded the event's influence, and achieved an upgrade in visitor experience.

3.3 Main Problems in the Digitalization of Zhaoqing's Cultural and Tourism Sector

Despite making certain progress and achievements in the digitalization process of cultural and tourism development, Zhaoqing still faces numerous challenges and has significant room for development amidst the rapid advancement of digital technology.

(1) Uneven Distribution of Infrastructure: There is a substantial gap in the digitalization level between core scenic spots and remote cultural and tourism resource points. For instance, rural resource points like Fulicun Village in Sihui City have difficulty meeting modern tourists' demands for smart services in terms of digital service levels.

(2) Insufficient Depth in Digital Technology Application: Most digitalization projects remain at the level of information display and consultation. There is still room for enhancement in immersive experiences, personalized services, and intelligent management. For example, within the "Zhao Hui Wan" mini-program smart cultural and tourism platform, some developed features have not been put into actual use. Pages for food recommendations and cultural creative product purchases lack relevant products, affecting the depth of visitor experience. The mini-program still requires continuous optimization and operation.

(3) Lack of Professionals in Digital Cultural Tourism: The development of digital cultural tourism requires interdisciplinary talents proficient in both digital technology and cultural tourism development. A severe shortage of such talents leads to a significant disconnect between digital technology applications and the practical needs of the cultural and tourism business, hindering the digital transformation and upgrading of Zhaoqing's cultural and tourism industry[6].

4. Case Studies of Digital Technology Empowering Integrated Cultural and Tourism Development for Zhaoqing's Reference

Several regions in China have actively explored the integration of digital technology with culture and tourism, forming distinctive development models. Their progress provides valuable experience for Zhaoqing's digital cultural and tourism development.

Wuzhen in Tongxiang City, Jiaxing, Zhejiang Province, is a typical Jiangnan water town with superior geographical environment and natural resources, long known as the "Land of Fish and Rice, Home of Silk"[7]. In 2013, Wuzhen initiated the Wuzhen Theatre Festival. After over a decade of development, the festival has become a representative of characteristic towns in China, successfully establishing a festival IP. Regarding digital technology application in cultural and tourism development, Wuzhen has also achieved certain results[8]. 1) Establishment of Smart Tourism Services: Wuzhen's digital smart tourism services commence from the moment tourists plan their trips. The scenic area has implemented digital facial recognition for entry. Through mini-programs, visitors can observe real-time visitor numbers and crowd heat maps within the scenic area, aiding in planning reasonable tour routes. The "Wuzhen Tourism Service" mini-program provides functions such as hotel introductions, official mall, Wuzhen food recommendations, itinerary assistant, and scenic area transportation, offering great convenience for visitors. 2) Digital Promotion of Characteristic Culture: At the Zhaoming Academy, visitors can wear MR mixed reality glasses. Guided by the digital human "Ji Xiaolan," visitors can personally experience the historical changes of the Wenlan Pavilion and the "Complete Library of the Four Treasuries." This immersive experience uses technology to activate traditional culture,

rejuvenating static cultural heritage. 3) Building an Industrial Ecosystem Closed Loop: Wuzhen skillfully combines convention and exhibition economy, digital industry, and cultural tourism services, forming a mutually reinforcing virtuous cycle. The World Internet Conference brings global perspectives and innovative resources. Mature digital infrastructure attracts enterprise settlement, while a prosperous cultural tourism industry enhances regional vitality, ultimately achieving the sublimation from a three-day conference to a year-round industrial ecosystem.

As the capital city of Jiangsu Province, Nanjing is an important central city in eastern China. It is among the first batch of national historical and cultural cities and a key national scenic and tourist destination, boasting profound historical and cultural heritage as well as tremendous potential for future development. Against the backdrop of rapid advancements in digital technology, Nanjing has explored a distinctive pathway by introducing cutting-edge technologies such as artificial intelligence, big data, and immersive experiences. Its developmental goal is to rejuvenate its millennia-old cultural legacy in the digital era[9]. 1) Immersive Cultural Experiences: The application of digital technology breaks away from traditional viewing modes, allowing visitors to immerse themselves in the scene. During nighttime boat tours along the Qinhuai River, the interplay of light and shadow along both banks unfolds like a flowing historical scroll, evoking a sense of sailing through time across a thousand years. At the Jiangning Weaving Museum, the immersive performance "Dream of the Red Chamber: The Grand Dream" combines digital art and close-range acting to transform literary classics into tangible, perceptible experiences. 2) Vivid Historical Legacy: Nanjing has developed the "Mr. Cao" AI intelligent dialogue system, which enables interactive conversations about the literary masterpiece Dream of the Red Chamber. It can also intelligently correlate different versions of scripts and paintings, making classical literature more vivid and engaging. 3) Innovative Cultural Consumption: Nanjing's cultural and creative products are characterized by novel ideas and diverse categories. Digitalization has infused traditional cultural IPs and intangible heritage skills with new market vitality. For instance, the Nanjing Brocade Museum has launched cultural and creative products with aesthetics appealing to younger generations by extracting classic patterns and developing digital collectible cards. This approach promotes traditional culture in a more popular and accessible manner while generating economic benefits.

5. Innovative Pathways for Digital Technology Empowering Integrated Cultural and Tourism Development in Zhaoqing

Based on the analysis of successful domestic cases like Wuzhen and Nanjing, and considering Zhaoqing's cultural and tourism resource characteristics and current digitalization status, the following innovative pathways are proposed for digital technology to empower the high-quality integrated development of culture and tourism in Zhaoqing:

(1) Construct an Integrated Smart Service Platform. Wuzhen achieved full-process digital services through an online mini-program. Zhaoqing can learn from this experience by further improving the functionalities of the "Zhao Hui Wan" platform, expanding new features, optimizing user experience, and upgrading the platform from information display to service integration and intelligent decision-making. For scenic area visits, functions like crowd monitoring, intelligent route recommendations, audio guides, and one-stop ticketing can be implemented. For transportation guidance, integrated services covering public transport, shared mobility, and smart parking can be provided, enhancing the convenience and experience of tourist travel. The platform's operation should adopt a multi-agent collaborative model guided by the government, operated by the market, and with enterprise participation. This ensures lawful and compliant operation while stimulating market vitality.

(2) Promote the Construction of Immersive Cultural Experiences. Immersive technologies like Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) provide powerful tools for the digitalization process in cultural tourism, bringing static culture to life. Zhaoqing can leverage the successful experience from the "Zhaoqing Ring Star Lake Blue Ribbon Beer Carnival" event and utilize cutting-edge technologies to create immersive environmental experiences. For instance, capitalizing on Duan Inkstone culture, a Digital Duan Inkstone Experience Hall can be established at the Zhaoqing City Museum. VR technology can be used to showcase the inkstone-making process, allowing visitors to personally experience each step from quarrying and material selection to design, carving, polishing, and the final product. Drawing inspiration from the success of "Only Henan ·Drama Fantasy City," digital technology can be used to creatively transform Zhaoqing's unique Song Dynasty culture and Bao Zheng culture resources, developing immersive performance projects like "Song Dynasty City Time-Travel Experience" or "Lord Bao's Courtroom Interactive Theater,"

creating cultural tourism performances that offer a sense of presence and enhancing visitor participation and cultural identification.

(3) Create Digital Cultural Tourism IP and Intelligent Cultural Ambassadors. Developing distinctive digital cultural tourism IP can increase the appeal and influence of Zhaoqing's cultural tourism brand. Wuzhen strengthened brand recognition through its theatre festival IP, while Nanjing launched the "Mr. Cao" AI dialogue system to revitalize "Dream of the Red Chamber." Zhaoqing can further develop the IP image of "Qing Xia Xia" from the second beer carnival or create new digital IP images. For example, leveraging the Zongzi element to develop a "Zongzi Kid" image. Through short videos, social media interactions, etc., a matrix of digital IPs for Zhaoqing's cultural tourism can be built, enhancing the dissemination power of cultural tourism content.

(4) Promote Coordinated Digital Regional Development. With Duanzhou District as the core for Zhaoqing's cultural tourism industry development, a Digital Cultural Tourism Innovation Demonstration Zone can be established first, radiating to surrounding areas. Regional linkage can be facilitated through digital platforms, designing digital tourism routes to ultimately achieve visitor flow sharing and coordinated development. The potential for cross-border integration should be deeply explored, increasing integration between culture/tourism and agriculture, industry, and sports. Digital technology can create new formats and experiences, such as developing smart agricultural tourism routes where visitors learn about modern agricultural technology through digital systems; building digital museums for industrial heritage sites showcasing Zhaoqing's industrial development history; and developing digital service platforms for sports tourism integrating event information, venue booking, sports social networking, etc. This plan proposes to establish a Digital Cultural Tourism Innovation Fund to support enterprises and teams in R&D for digital technology applications in cultural tourism; build digital cultural tourism maker spaces to provide technical support and incubation services; and organize digital cultural tourism innovation competitions to discover and nurture outstanding projects and talents. By fostering a favorable innovation ecosystem, the enthusiasm and creativity of the whole society in participating in Zhaoqing's digital cultural tourism construction can be stimulated.

6. Conclusion and Outlook

Focusing on the core question of how digital technology can empower the high-quality integrated development of culture and tourism in Zhaoqing City, through analyzing the current status, drawing on experiences, and proposing pathways, the following conclusions are formed:

First, digital technology empowerment is a crucial pathway for Zhaoqing to achieve the transformation, upgrading, and high-quality development of its cultural and tourism industry. By comprehensively permeating the entire chain of the cultural and tourism industry with digital technology, it can effectively address development bottlenecks such as fragmented resource development, monotonous experience methods, and insufficient brand influence, unlocking the potential value of Zhaoqing's cultural and tourism resources.

Second, Zhaoqing's cultural tourism digitalization has established a certain foundation but still exhibits obvious shortcomings in infrastructure, application depth, and talent support. Future efforts need to systematically advance from platform construction, format innovation, brand building, and regional coordination to form a complete pathway system for digital technology empowering integrated cultural and tourism development.

Third, digital technology empowering integrated cultural and tourism development is an iterative process requiring multi-party collaboration among government, enterprises, and society, emphasizing both technological and model innovation, and integrating online platforms with offline experiences, to truly achieve deep integration of technology and culture and promote high-quality development of the cultural and tourism industry.

Looking ahead, with the continuous maturation of technologies like the metaverse, artificial intelligence, and digital twins, digital cultural tourism will embrace broader development space. Zhaoqing should grasp technological trends, plan ahead in new fields like the cultural tourism metaverse, and explore new paradigms of virtual-real integrated tourism experiences. Simultaneously, attention should be paid to digital inclusion and humanistic care, ensuring digital technology truly serves cultural inheritance and the people's needs for a better life, allowing Zhaoqing to radiate new cultural vitality and tourism charm in the digital age.

Empowering Zhaoqing's integrated cultural and tourism development with digital technology is a

systematic project requiring long-term commitment and continuous innovation. It is recommended that Zhaoqing City formulate medium- and long-term plans for digital cultural tourism development, establish cross-departmental coordination mechanisms, increase financial and talent support, and implement various measures in a phased and step-by-step manner, ultimately building Zhaoqing into a digital cultural tourism innovation demonstration zone within the Guangdong-Hong Kong-Macao Greater Bay Area and an internationally renowned cultural and tourist destination.

Acknowledgement

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