A Study on the Innovation of Immersive Experiences in Guangxi's Intangible Cultural Heritage Tourism in the Digital Age

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Abstract: Digital technology is profoundly reshaping the forms of existence and experiential paradigms of intangible cultural heritage, providing a key driving force for the transformation of intangible cultural heritage tourism in ethnic regions from a 'sightseeing-oriented' model to an 'immersive experience-oriented' one. Taking intangible cultural heritage tourism in Guangxi as its subject, this paper focuses on the core question of 'how digital technology reconstructs the immersive experience of intangible cultural heritage tourism'. It proposes a four-dimensional model for the immersive experience of such tourism, whilst systematically reviewing digital immersive practices in projects such as Zhuang brocade and bronze drums, and identifying five typical models, including 'skill revitalisation + interactive design'. The research reveals that whilst Guangxi has achieved sporadic breakthroughs in innovating immersive experiences for intangible cultural heritage, it faces multiple tensions, including the balance between technological adaptation and cultural authenticity, the depth of experience versus the breadth of participation, resource integration versus commercialisation, and regional differences versus the replication of models. Future innovation should adhere to the principle of technological application to preserve cultural authenticity, construct a segmented and progressive experience system, and improve the support system for empowering inheritors, thereby driving Guangxi's transition from a "region rich in intangible cultural heritage resources" to a "strong destination for intangible cultural heritage tourism".

Keywords: Digitization; Guangxi Intangible Cultural Heritage; Intangible Cultural Heritage Tourism; Immersive Experience; Living Inheritance

1. Introduction

Driven by the ongoing wave of digitalisation, the forms of preservation and modes of experience for intangible cultural heritage are undergoing a profound transformation. This process provides a key impetus for the transition of intangible cultural heritage tourism in ethnic minority regions from the traditional 'sightseeing' model to 'immersive experiences'. The 2025 'Guiding Opinions on Vigorously Developing Digital Consumption to Co-create a Better Life in the Digital Age' states that the use of modern information technologies such as artificial intelligence, virtual reality and augmented reality should be encouraged, with a focus on creating diverse new consumption scenarios characterised by immersion and experiential engagement. Under this policy direction, how to effectively stimulate the intrinsic vitality of intangible cultural heritage through digital technology has become a core issue in driving the high-quality development of the culture and tourism sectors.

In recent years, Guangxi has continued to explore practical approaches to the digital preservation and development of intangible cultural heritage. The 2024 'Zhuang March 3rd Festival' utilised 5G and VR panoramic live-streaming technology to convey the grandeur of the event, creating an immersive, on-site experience for viewersimblan. Platforms such as the Guangxi Digital Museum of Intangible Cultural Heritage and local VR exhibition halls have been successively established, laying the initial groundwork for the digital infrastructure of intangible cultural heritage resources. However, from the perspective of regional development patterns, the degree of coordination between digital technology empowerment and the industrialisation of intangible cultural heritage exhibits a spatial divergence characterised by "higher levels in the south and lower levels in

the north", with significant regional development imbalances. Furthermore, traditional static viewing experiences currently struggle to meet the younger generation's demands for participatory, social and personalised experiences.

Against this backdrop, this paper focuses on the core question of 'how digital technology can reconstruct the immersive experience of intangible cultural heritage tourism in Guangxi'. Integrating theories of immersive communication, the economics of experience and cultural heritage revitalisation, it systematically reviews typical models of digital immersive practices for Guangxi's intangible cultural heritage and explores how to optimise the balance between cultural authenticity, technological adaptability and commercial sustainability [1-3].

2. From 'Representation' to 'Presence': A Theoretical Lens on Immersive Digital Experiences of Intangible Cultural Heritage

The digital translation of intangible cultural heritage (ICH) refers to the process of using digital technology to transform intangible cultural heritage from its physical form into a digital form that can be stored, disseminated and interacted with. Its core lies in utilising digital technology to overcome the limitations of traditional recording methods, enabling the general public to engage with and understand intangible cultural heritage through smart devices, thereby promoting cultural dissemination.

In the context of ICH tourism, immersive experiences manifest as a dual convergence of 'technological presence' and 'cultural presence'. 'Technological presence' relies primarily on the integration of VR and AR digital devices—by constructing highly realistic virtual spaces that weave visual, auditory and even tactile elements into a single perceptual field, creating a sense of immersion where one feels 'fully immersed in the scene'. Cultural presence, on the other hand, returns to the authenticity and integrity of the intangible cultural heritage itself. Through the creation of settings, the incorporation of interactive elements, and the unfolding of narrative threads, the originally abstract cultural essence is gradually transformed into perceptible, tangible and interactive experiential fragments [3]. This enables participants to undergo a role transition from 'bystander' to 'participant' and ultimately to 'co-creator'; this is not only a reflection of the depth of the experience but also a key mechanism for the living transmission of ICH [4,5].

From a theoretical perspective, the creation and operation of digital ICH immersive experiences involve the integration of multiple theoretical frameworks. The theory of the experience economy reveals how immersive experiences transform culture into economic value, whilst the theory of cultural memory emphasises that digital media is driving a profound shift in cultural transmission methods—from 'textual memory' to 'embodied practice'—where users truly internalise cultural meaning into their minds and bodies through the processes of viewing and touching [6]. However, the creation of immersive experiences extends far beyond this. The theory of interactive ritual chains views immersive experiences as a new form of cultural ritual, in which users form emotional resonance and a sense of identity through shared attention and emotional connection. From the user's perspective, this reveals the pathways through which perceived usefulness, perceived ease of use, and immersive experience influence the willingness to adopt technology.

Consequently, immersive experiences in intangible cultural heritage tourism can be broken down into four interrelated dimensions: sensory immersion, interaction, narrative, and socialisation. For instance, the presentation of Dong folk songs can be achieved through sensory immersion, whilst virtual experience segments can be designed through interactive immersion. However, the living transmission of intangible cultural heritage should also focus on three objectives: cultural display, income generation through transmission, and dissemination to the public. This not only enhances the visibility of folk cultures such as Wuming Zhuang songs and Longlin Miao songs through digital means, but also helps bearers of intangible cultural heritage to increase their income through digital tourism, laying the foundation for the subsequent mutual promotion of the transmission of Guangxi's intangible cultural heritage and the development of tourism [7].

3. The Current Situation of Digital Development of Intangible Cultural Heritage Tourism in Guangxi and the Motivations for Immersive Transformation

In recent years, with the continued advancement of the 'One-Click Tour of Guangxi' smart tourism platform, Guangxi's cultural and tourism industry has been flourishing. Intangible cultural heritage tourism is rapidly evolving from a 'supplementary sector' to a 'core attraction'. The national cultural digitisation strategy has been implemented in tandem with Guangxi's 'Artificial Intelligence + Cultural Tourism' initiative, whilst local regulations on the protection of intangible cultural heritage across various cities have increasingly incorporated provisions for digital preservation, thereby providing institutional safeguards for the immersive transformation of intangible cultural heritage.

However, the limitations of traditional intangible cultural heritage (ICH) tourism models are becoming increasingly apparent. For a long time, ICH exhibitions have primarily taken the form of static, museum-style displays, with visitors viewing Zhuang brocade patterns and copper drum designs through glass, lacking opportunities for hands-on participation and emotional connection. At the same time, the fragmentation of resources remains a significant bottleneck to development: on the one hand, ICH projects are scattered across various regions and lack systematic integration. On the other hand, there is a structural mismatch between supply and demand, with visitors often facing the awkward situation of 'wanting to see something but being unable to find it, or finding it but not understanding it'. Furthermore, the link between cultural symbols and consumer products has not yet been fully established; the development of ICH intellectual property remains limited, making it difficult to generate a significant market impact [8]. The transmission of traditional ICH faces three core challenges: insufficient product innovation, monotonous narrative content, and a weak brand presence.

Against this backdrop, the immersive transformation of Guangxi's intangible cultural heritage tourism has benefited from a convergence of multiple driving forces. In terms of policy, Guangxi's 'Artificial Intelligence + Culture and Tourism' special initiative offers significant policy incentives. In the market, cultural and tourism consumption in the era of the experience economy is undergoing a profound upgrade; visitors are no longer satisfied with traditional sightseeing models, but are placing higher demands on participation, social interaction and personalisation. Technologically, the widespread adoption of 5G networks, the evolution of lighter VR/AR devices, and breakthroughs in AI-generated content technology have significantly lowered the barrier to entry for immersive experiences. Through VR/AR, audiences can 'enter' the scene of bronze drum casting and 'participate' in the process of weaving Zhuang brocade, using technology to reshape the way intangible cultural heritage is perceived. Technology provides ICH practitioners with both a practical need to increase their income and a cultural mission to disseminate their skills; digitalisation has thus become a dual-purpose tool that effectively balances 'display' and 'income generation'.

To date, Guangxi has launched a number of digital intangible cultural heritage projects: the Guangxi Museum uses digital technology to showcase bronze drum culture, whilst the Maritime Silk Road Intangible Cultural Heritage Experience Centre highlights exquisite crafts such as shell carving and horn carving. The 'Nanning Nights' immersive heritage district incorporates elements such as Zhuang brocade and embroidered balls into the night-time economy. In terms of festive events, the Zhuang March 3rd 'Smart Song Fair' has moved traditional mountain song duets online, constructing a new space for cultural identity through multi-dimensional scenes, folk performances and a media-based presentation that integrates online and offline elements, transforming visitors from 'spectators' into 'participants'.

It is worth noting that whilst these initial explorations still exhibit the characteristics of sporadic breakthroughs, they have already demonstrated an intrinsic evolutionary logic shifting from 'technological overlay' to 'experiential reconstruction'. Early explorations often focused on the introduction of technology, merely integrating VR/AR devices into the settings of intangible cultural heritage exhibitions. Today, we are beginning to pay particular attention to the integrity of the user experience, striving to incorporate emotional connections and cultural understanding beyond mere sensory stimulation. From museums to communities, from tourist attractions to workshops, and from festive events to online platforms, the coordinated deployment across multiple settings is weaving a network of

intangible cultural heritage experiences that spans both online and offline spaces. These explorations have accumulated valuable experience for the systematic transformation of intangible cultural heritage tourism in Guangxi, marking a shift from a ‘tourist-oriented’ model to an ‘immersive experience’ model [9].

4. Model Construction of Immersive Experience Innovation in Guangxi's Intangible Cultural Heritage Tourism

The immersive transformation of Guangxi's intangible cultural heritage tourism is not a simple application of a single technology, but forms differentiated innovation paths in multiple scenarios. Through an investigation of the digital practices of intangible cultural heritage projects such as Zhuang brocade, bronze drums, and silk balls, we have refined five innovative models with typical significance, each corresponding to different technical paths, scene carriers, and value logics.

The "Craft Activation + Interactive Design" model centers on the digital transformation of traditional crafts, enhancing cultural cognition through interactive interfaces. For example, the immersive interaction of Zhuang brocade turns the weaving process into a digital game, while the Yao embroidery interactive device disassembles patterns and conveys their cultural meanings, as is shown in Figure 1. The core of this model lies in establishing a digital repository of crafts, lowering participation barriers, and creating emotionally resonant scenarios. It is well-suited for intangible cultural heritage projects that have strong visual representation and involve collaboration with inheritors.

Figure 1. Intangible Heritage Experience Interaction

The "AR Empowerment + Cultural and Creative Transformation" model takes a lightweight consumption route, embedding AR into cultural and creative products to turn static souvenirs into communication touchpoints, as is shown in Figure 2. The interactive souvenir of Jingxi silk balls can present production process animations through scanning, extending the experience beyond the tour and achieving social fission. The core of the model is that no additional equipment is required, making it suitable for intangible cultural heritage with high symbol recognition and mobile terminal adaptation, and more in line with the needs of young groups.

Figure 2. AR Silk Ball Cultural and Creative Product

The "Block Aggregation + Immersive Performance" model uses spatial reconstruction as a carrier, integrating diverse business formats to build an immersive field. For example, the ICH Block in Hepu Mooncake Town gathers various ICH resources, integrating forms such as technological performances and interactive experiences, as is shown in Figure 3. The core of the model lies in spatial agglomeration to reduce costs, business format integration to extend stay time, and interactive performances to enhance emotional connection. It is suitable for areas with dense ICH resources, convenient transportation, and mature operations.

Figure 3. Heritage Street Event Venue at Hepu Mooncake Town

The "Digital Platform + Resource Integration" model breaks through time and space constraints, gathering scattered ICH resources in the cloud, as is shown in Figure 4. Projects such as the Guangxi ICH Digital Museum and Qianjiadong

Cultural Tourism Resort use technologies like digital archiving and AR reproduction to achieve ICH preservation and immersive experiences, building an online-offline integrated closed loop. The core is to integrate fragmented resources through a digital base and feed back to offline experiences.

Figure 4. Digital Platform + Resource Integration

The "Digital IP + Cultural Tourism Linkage" model focuses on the intellectual property development of super cultural symbols, leveraging digital technology to amplify the influence of the original culture. For example, Guangxi boasts highly recognizable cultural IPs such as Liu Sanjie, embroidered balls, and bronze drums, all of which hold broad prospects for digital development. One approach is to develop trendy IP products, such as blind boxes and dolls designed based on Zhuang character prototypes, as is shown in Figure 5. These products not only retain the aesthetic characteristics of traditional costumes and totems but also enter public life through modern, youth-oriented expressions. Concurrently, elements like bronze drums and ethnic minority architecture can achieve the extension and dissemination of cultural value through formats such as 3D modeling and NFT digital collectibles. The underlying logic of this model lies in the synergy of IP-driven visibility and emotional connection: digital technology provides a medium for expressing traditional culture, while offline physical products carry emotional resonance and facilitate consumption conversion. The integration of these two aspects promotes the empowerment and upgrading of cultural IP.

In conclusion, these five models are not mutually exclusive but rather complementary: the Craft-Interaction Model delves into the core of traditional techniques; the AR Cultural and Creative Model expands consumption scenarios; the Block Aggregation Model builds spatial carriers; the Digital Platform Model integrates resource bases; and the Digital IP Model amplifies cultural influence.

Figure 5. Blind Box IP Image of Zhuang Ethnic Figures

5. Practical Challenges and Optimization Strategies for the Innovation of Immersive Experience in Intangible Cultural Heritage Tourism in Guangxi

While digital technology brings convenience to the dissemination of intangible cultural heritage, it simultaneously harbors potential risks. Specifically, the ease afforded by digitalization has precipitated rampant copyright violations. The unauthorized duplication of digital intangible cultural heritage resources and the alteration of such heritage works for commercial gain have placed intangible cultural heritage inheritors in a challenging predicament concerning rights protection. Immersive experiences grapple with the inherent contradiction between user accessibility thresholds and the goal of mass popularization, rendering it difficult to achieve a harmonious balance between in-depth engagement and superficial interaction. The discrepancy between the digital literacy of inheritors and the operational capabilities of the platform impedes the sustainable development of related projects. Additionally, the uneven distribution of resources and developmental disparities across regions pose significant obstacles to the replication and widespread adoption of successful models.

Accordingly, a systematic framework that genuinely empowers heritage inheritors should be constructed from multiple dimensions. On one hand, it is imperative to develop digital operation toolkits and establish a tiered training system to enhance inheritors' digital literacy and operational competencies. On the other hand, a

revenue guarantee mechanism should be established, enabling inheritors to obtain tangible benefits from digital innovation through approaches such as traffic support and revenue sharing. At this juncture, the logic and value of credit collaboration become particularly critical. In contrast to the limitations of traditional copyright protection systems in terms of ex post right confirmation and accountability, the credit collaboration mechanism integrates credit evaluation into the entire process of digital content production, dissemination, and reuse of intangible cultural heritage. By dynamically recording subject behaviors and implementing credit constraints, it effectively fills the structural gaps in the current system regarding behavioral norms and the construction of collaborative mechanisms, thereby realizing the innovation and improvement of copyright protection at the institutional level. To address the challenges of regional disparities and model replication, we can adopt the method of establishing cross-regional cooperation and model licensing mechanisms, and encourage localities to carry out localized adaptation based on their own intangible cultural heritage resources, so as to achieve an organic unity of commonality and individuality.

In response to the above issues, we should also develop systematic optimization strategies, establish cultural baseline standards and evaluation criteria for the digitization of ICH, ensure that technology serves the function of cultural dissemination, and promote the innovative development of immersive ICH tourism experiences in Guangxi [10]. At the same time, we should build a tiered and progressive experience system that achieves broad reach through low-threshold access, offers in-depth experiences through advanced modules, and encourages user participation in co-creation projects to facilitate the transition from consumers to co-creators. Intangible cultural heritage projects represent the collective wisdom of communities, and the blurred boundaries between individual and collective rights make them prone to ownership disputes during the digitization process [11]. It is also crucial to formulate technical application guidelines for digital immersive ICH experiences and develop tools to evaluate the effectiveness of these immersive experiences. This will not only provide clear guidance for innovative practices [4] but also effectively guard against the risks of technological alienation and cultural distortion, ensuring that the innovation of immersive ICH tourism experiences in Guangxi remains on a healthy and sustainable path.

6. Conclusions and Outlook

Digital immersive experiences are an effective way to sustainably pass on the intangible cultural heritage of Guangxi. Technology offers the possibility of high-fidelity preservation and immersive display of intangible cultural heritage, enabling users to transform from mere observers to active participants and co-creators. The five typical models of immersive experiences in Guangxi's intangible cultural heritage tourism have been formed. The trinity balance of cultural authenticity, technological adaptability and commercial sustainability is the key to the success or failure of the innovation of immersive experiences in Guangxi's intangible cultural heritage tourism. Future innovation needs to shift from "single-point technological breakthrough" to "systemic ecological construction", focusing on in-depth content narrative, all-scenario integration and multi-stakeholder co-governance.

Theoretically, this study has constructed a "four-dimensional model" of immersive experience in ICH tourism, covering sensory immersion, interactive immersion, narrative immersion, and social immersion, thus expanding the application boundary of immersive communication theory in the field of ICH tourism. The research has proposed a "digital immersion + social communication" dual-driven framework for ICH dissemination, enriching the dialogue interface between cultural memory theory and interaction ritual chain theory, and providing a typological analysis tool for the integration of ICH and tourism in ethnic regions. In terms of practical implications, for Guangxi, it should leverage its rich ethnic cultural resources to create a "Magnificent Guangxi, Immersive ICH" tourism brand. For ethnic regions, the Guangxi practice provides a referential experience of digitalization as an intermediary for the transformation of cultural capital, exploring new paths for the coordinated development of ICH inheritance and rural revitalization.

In future research endeavors, our focus could be directed towards conducting long-term tracking studies on the effects of immersive experiences, integrating quantitative analytical methodologies

to compensate for the prevailing methodological constraints predominantly characterized by qualitative research. This approach would facilitate a more precise elucidation of the intrinsic nexus between users' subjective experiences and the transmission of ICH cultural values. Concurrently, it would be beneficial to foster cross-regional comparative analyses of ICH digitization models in areas such as Yunnan and Guizhou, extracting shared experiences and distinctive features to formulate replicable and scalable regional coordinated development strategies. Furthermore, we could refine the design of digital ICH experiences to bolster users' sustained usage intentions and enhance their engagement with digital ICH products, thereby fostering improved inheritance and dissemination of ICH culture through digital channels.

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