

# Digital Intelligence Revitalization: A Study on the Integrated Development of Culture, Commerce, and Tourism in Huishan Ancient Town

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**Abstract:** *This study explores the pathways and value of digital intelligence technology in empowering the integration of culture, commerce, and tourism in Huishan Ancient Town, providing practical references for cultural heritage revitalization and tourism industry upgrading. Current integration efforts face challenges including underdeveloped infrastructure, limited marketing channels, insufficient experiential content, and delayed management responses. To address these issues, the research conducted a questionnaire survey across four dimensions. The findings indicate urgent needs for optimizing network infrastructure and smart devices, innovating interactive marketing formats, developing immersive cultural projects, and enhancing real-time management capabilities. Accordingly, the paper proposes systematic recommendations focusing on facility upgrades, marketing innovation, experiential enhancement, and management optimization to drive high-quality development in Huishan Ancient Town.*

**Keywords:** *Integration of Culture, Commerce and Tourism; Digital and Intelligent Marketing; Digital and Intelligent Experience; Huishan Ancient Town*

## 1. Introduction

As the core driver of deep integration among culture, commerce, and tourism, digital technologies—such as artificial intelligence, big data, and virtual reality—redefine experiential scenarios, optimize service processes, and strengthen industrial collaboration. These innovations provide new pathways for revitalizing cultural resources through digitalization and upgrading tourism consumption, continuously empowering high-quality development across cultural, commercial, and tourism sectors<sup>[1-2]</sup>.

The ancient towns of Jiangnan serve as vital repositories of Chinese civilization, embodying the philosophy that “lucid waters and lush mountains are invaluable assets” through their living heritage. These towns preserve collective memories of regional traditions, architectural artistry, and ancient lifestyles. Among Jiangnan’s ancient towns, Wuxi Huishan Ancient Town stands out with its millennium-old ancestral hall complex, the intricate waterways of Huishan Creek along the Grand Canal, and Wuxi’s exquisite embroidery techniques – all recognized as intangible cultural heritage. Celebrated as the “Cultural Core of Jiangnan” and “Open-Air History Museum”, it hosted the 2025 CCTV Spring Festival Gala’s Wuxi sub-venue. Performer Ni Ni’s fan performance of traditional watercraft navigation, accompanied by local heritage elements, ignited a cultural revival across the Shanghe Tang neighborhood. This phenomenon not only showcases the town’s cultural allure and tourism appeal but also demonstrates the potential for harmonious integration of historical spaces with modern consumer experiences.

In recent years, Huishan Ancient Town has capitalized on its dual geographical and cultural advantages of the “Grand Canal-Huishan” corridor, adhering to the principle of culture as the soul, tourism as the body, and commerce as the lifeline. In 2023, it attracted over 1.3 million visitors, generating tourism revenue of 158 million yuan—a significant rebound from pre-pandemic levels—demonstrating robust recovery capabilities and brand influence. However, the town faces critical challenges: On one hand, ancient heritage sites require revitalization through preservation while transforming static resources into interactive experiences. On the other hand, traditional sightseeing models struggle to meet market demands, particularly among younger generations, for immersive, interactive, and scenario-based consumption, highlighting the “revitalization dilemma” of cultural

heritage.

In the current era where the integration of culture, commerce, and tourism faces challenges such as monotonous presentation formats of cultural resources and inefficient element coordination, digital intelligence technologies have emerged as a game-changer through their immersive interaction and intelligent connectivity capabilities. By revitalizing static resources and optimizing service pathways, these technologies effectively address the issues of superficial cultural experiences and fragmented consumption scenarios. Digital tools like Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence (AI) now offer new possibilities for immersive cultural heritage reconstructions, scenario-based storytelling, and IP development<sup>[3]</sup>. These innovations not only enable dynamic interpretation of “static relics” and create cross-temporal interactive experiences, but also integrate land-water routes and commercial resources, driving genuine spatial and content convergence among culture, commerce, and tourism.

This study examines Huishan Ancient Town as a case study to systematically explore the innovative mechanisms and empowerment pathways of digital technology across the cultural, commercial, and tourism value chain. For the first time, the research constructs an integrated development model from the holistic perspective of “cultural-commercial-tourism tripartite synergy.” Addressing practical bottlenecks such as inadequate infrastructure support, limited marketing reach, superficial experiential formats, and sluggish management coordination, it establishes a systematic analytical framework covering four dimensions: infrastructure, marketing channels, experiential content, and management efficiency. This framework comprehensively addresses the entire digital transformation process from foundational support to operational management. Building on this foundation, the study proposes a three-tier advancement strategy of “digital revitalization, industry synergy, and brand communication,” driving cultural heritage from static preservation to dynamic utilization, industry integration, and brand value enhancement. The research aims to provide theoretical support and implementation pathways for the sustainable development of Huishan Ancient Town, while offering reusable practical paradigms for the digital transformation of similar cultural heritage sites.

## **2. Theoretical Analysis**

### **2.1 Conceptual Definition**

The integration of culture, commerce, and tourism essentially represents a value co-creation model that leverages resources from all parties, guided by market demands and centered on cultural elements. Through deep integration of commercial scenarios and tourism experiences, it promotes coordinated development among culture, commerce, and tourism (Huang Xiaohui, 2016)<sup>[4]</sup>. Digital intelligence, as an evolutionary form of deep integration between digitization and intelligentization, takes data as its core element. By utilizing digital technologies such as big data, artificial intelligence, cloud computing, IoT, and blockchain, it achieves intelligent transformation of data.

### **2.2 Theoretical Basis**

#### **2.2.1 Theory of Business Integration**

The theory of industrial convergence describes the dynamic process where different industries intersect through technological, operational, and market integration, breaking traditional boundaries to create new hybrid business models. This concept holds significant implications for industrial innovation and transformation. In the context of cultural-commercial-tourism integration in ancient towns, this theory provides practical solutions to address homogenization. Ancient towns should transcend single-sightseeing models by adopting the “Ancient Town+” convergence strategy. For instance, revitalizing intangible cultural heritage through “Ancient Town + Cultural Creativity” to develop immersive experiences; recreating historical scenes via “Ancient Town + Digital Technology” using VR/AR; and extending industrial chains through “Ancient Town + Agriculture/Wellness”. This approach not only achieves resource integration and value enhancement but also facilitates the transition of ancient towns from traditional tourism functions to diversified coexisting industries. This aligns with scholars’ core proposition that tourism industry convergence forms new operational models through four pathways: resource integration, technological advancement, market expansion, and functional innovation, ultimately establishing a sustainable development ecosystem (Ma Xuefeng, 2010)<sup>[5]</sup>.

### 2.2.2 Theoretical Aspects of Digital Technology

Digital technology theory, centered on core technologies like big data, artificial intelligence, and the Internet of Things, leverages cloud platforms and smart terminals to transform production and lifestyles through technological innovation and integrated applications. Its core value lies in empowering traditional industries through technological empowerment and process reengineering, breaking through efficiency bottlenecks, fostering new business models, and reshaping social resource allocation – serving as a strategic cornerstone for building national competitive advantages. This theory can be applied to the integration of cultural, commercial, and tourism elements in ancient towns, revitalizing cultural resources through digital technology. For instance, creating immersive night tours, virtual town guides, and smart cultural tourism platforms can transcend traditional sightseeing limitations, extend industrial chains, and achieve dual goals of cultural preservation and tourism revenue generation, thereby promoting sustainable development of ancient towns. This approach aligns with scholars' observations that digital technology can reconstruct cultural tourism industry chains, drive business model innovation, and enhance experiential upgrades (Zhou Jin, 2021)<sup>[6]</sup>.

### 2.2.3 Interactive Experience Theory

Interactive experience refers to the comprehensive perception formed by users during their engagement with products or services, with its core lying in two-way participation and real-time feedback. As the key link connecting IP characters, cultural and creative products, and tourists' emotions, interactive experiences can transform static culture into perceptible and participatory dynamic experiences through anthropomorphic IPs, immersive scenarios, and diverse activities. This enhances tourists' sense of belonging and boosts their willingness to consume. Based on this theory, in the practice of integrating culture, commerce, and tourism in ancient towns, we should delve into the core of local culture, shape distinctive IP characters, and systematically develop story-driven scenarios and interactive cultural products around them. This enables tourists to transition from passive “viewers” to active “participants,” strengthening cultural identity through deep interaction. Ultimately, this drives the transformation of ancient towns from homogeneous sightseeing destinations to distinctive, immersive cultural tourism destinations. The theoretical analysis culminates in the research framework presented in Figure 1, which illustrates the mechanisms of digital and intelligent empowerment for the integrated development explored in this study.

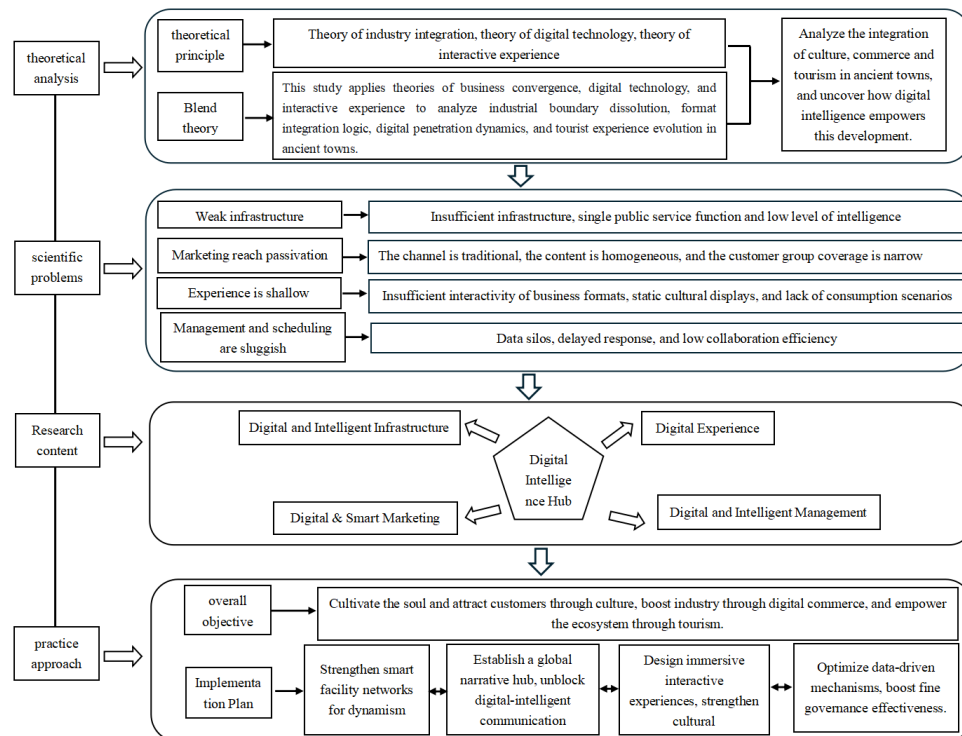


Figure 1 Digital-Intelligent Empowerment Framework for Culture-Commerce-Tourism Integration in Huishan Ancient Town.

### **3. The Integration of Ancient Town Commerce and Tourism and the Development of Digital and Intelligent Tourism**

#### ***3.1 Overview of the Integration of Culture, Commerce and Tourism in Huishan Ancient Town***

Huishan Ancient Town, a key historical and cultural landmark in Wuxi, possesses profound heritage including 118 ancestral hall complexes, the Ancient Canal, Huishan Temple, the “Second Best Spring Under Heaven”, and intangible cultural heritage like clay figurines, tin embroidery, and erhu. Designated a national 5A-level tourist attraction and provincial cultural-tourism demonstration zone, it is positioned as a “Jiangnan Cultural Landmark” in Wuxi’s 14th Five-Year Plan. In November 2020, the Ministry of Culture and Tourism issued guidelines emphasizing the digital transformation of cultural industries to develop new enterprises, formats, consumption models, and enhance competitiveness<sup>[7]</sup>. The town offers diverse commercial services including local cuisine, cultural retail, and heritage workshops. While AR guides and digital maps enhance independent tours, personalized routing, real-time crowd management, and social sharing features require further digital investment to meet evolving visitor expectations.

#### ***3.2 Problems in the Integration of Culture, Commerce and Tourism in Huishan Ancient Town***

**Weak Infrastructure.** The underdeveloped digital infrastructure has become a critical bottleneck in Huishan Ancient Town’s cultural-commercial-tourism integration, with supply-demand imbalances becoming particularly evident during peak hours. Sparsely distributed base stations cause frequent payment delays and transaction lags during QR code payments, directly dampening instant consumption willingness. Outdated navigation devices with drifting positioning force tourists to repeatedly detour between ancestral halls and surrounding ponds, increasing assistance requests and extending service routes. The absence of edge computing nodes results in delayed data transmission, with real-time passenger density and dwell time calculations showing over 15% errors, rendering reservation systems incapable of dynamically adjusting capacity. Separately developed business systems with inconsistent interfaces create high interoperability costs between ticketing, merchant, and security platforms. Fragmented information systems hinder unified coordination, leaving the ancient town’s digital infrastructure struggling to support diverse concurrent demands across multiple scenarios.

**Constrained Marketing Reach.** The sluggish digital marketing efforts and limited outreach scope have hindered the sustained impact of Huishan Ancient Town’s promotional initiatives. Slow content refresh cycles result in repetitive visuals and text, while fragmented distribution channels fail to establish search portals or topic clusters, leading to subpar engagement rates among target audiences. The absence of data-driven scheduling mechanisms for festivals further prevents marketing investments from generating long-tail effects, keeping overall conversion efficiency at a low level. In summary, Huishan Ancient Town still faces challenges including limited marketing channels, narrow audience targeting, and outdated promotional strategies.

The experiential landscape remains superficial. Huishan Ancient Town’s offerings have long been confined to basic sightseeing and photo-taking, with cultural narratives failing to resonate deeply with visitors. Temples are displayed through static exhibits, while intangible cultural heritage elements like clay figurines and tin embroidery are reduced to window displays, leaving tourists disconnected from the craft’s historical context. The monotonous visitor flow and disjointed spatial sequences result in both shorter dwell times and lower per capita spending. The absence of interactive systems, reward programs, or co-creation platforms further limits visitors’ ability to contribute personal experiences, depriving cultural immersion of lasting memories and viral potential. These issues reduce emotional connections to disposable consumption, preventing the town’s resources from becoming sustainable experiential assets. With limited content offerings, the result is diminished revisit rates and diminished brand value.

Operational management deficiencies persist. The digital and intelligent management system exhibits critical shortcomings: delayed responses have caused inefficient operations across Huishan Ancient Town’s entire workflow chain. With subsystems operating independently and inconsistent data standards, real-time synchronization of visitor flow, ticketing, and merchant information during peak hours remains unachieved, resulting in delayed dispatch instructions and forced reactive emergency responses. Inadequate coverage of perception devices delays abnormal behavior detection, causing risks to reach terminals only after incidents occur. Redundant complaint channels with average

response times exceeding six hours allow minor disputes to escalate through screenshot amplification in silent windows, accelerating negative public sentiment. Compounding these issues is the lack of a unified data foundation, where decision-making relies on experience rather than computational power. This imbalance in resource allocation and rising operational costs creates a vicious cycle of “information gaps → delayed responses → declining reputation,” leaving the scenic area struggling to adapt to rapidly evolving market demands.

#### 4. Questionnaire Design and Analysis

##### 4.1 Questionnaire Design

This questionnaire establishes a systematic evaluation framework for cultural-commercial-tourism integration and digital-intelligent applications in Huishan Ancient Town, developed from a visitor-centric perspective. The survey comprises four sections: basic information, awareness assessment, digital-intelligent application implementation, and development recommendations. The core section focuses on four primary indicators (cultural-commercial-tourism integration, digital-intelligent infrastructure, digital-intelligent marketing, and digital-intelligent experience management) with 12 secondary indicators. Using a five-point Likert scale (5=Excellent to 1=Poor), the questionnaire facilitates systematic collection of authentic feedback regarding resource integration, business model innovation, and technological applications. This structured data supports subsequent empirical analysis and strategy optimization. The questionnaire framework is illustrated in Figure 2.

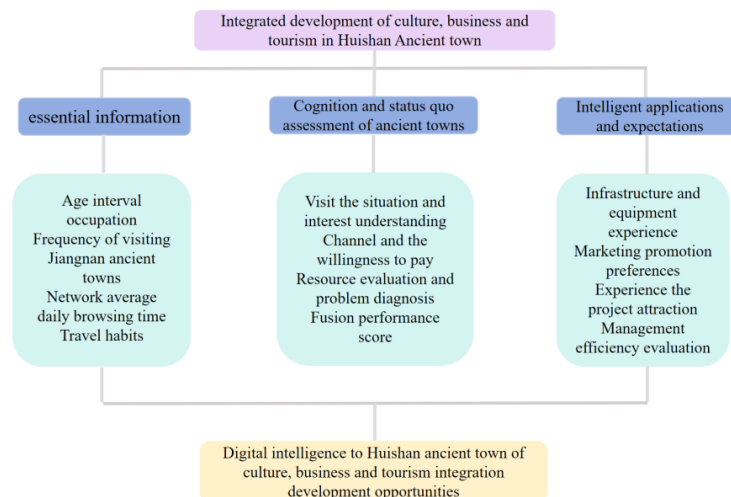


Figure 2 Questionnaire survey framework table.

##### 4.2 Analysis of the Current Situation of the Research Object

The survey sample primarily consisted of young adults aged 18-25 (37.35%), as shown in Figure 3. The occupations were predominantly students (36.73%), corporate employees (23.39%), and cultural/educational professionals (19.23%). Data revealed that 45.5% of respondents visit tourist attractions 3-5 times annually, while the potential customer base (those who have never visited) remains substantial. This core demographic typically spends over 2 hours at destinations, demonstrates frequent internet usage, and 78% maintains consistent travel habits. These characteristics provide a clear target audience for integrating cultural, commercial, and tourism sectors with digital and intelligent applications.

##### 4.3 Understanding of Huishan Ancient Town

Cognitive and hindering factors of non-visitors. The main reasons visitors miss Hui Shan Ancient Town include insufficient promotion and limited information, while others find the area overly commercialized and lacking distinctive features. This group generally hopes for more unique tourism offerings and stronger marketing efforts. They still maintain strong interest in the town's historical culture, local cuisine, and other resources, demonstrating clear willingness to explore and experience its unique charm.

Visitor cognition and experience evaluation. Visitors mainly obtain information through social media (such as WeChat, TikTok, Xiaohongshu) and recommendations from friends and relatives, with the proportions being 24.07% and 20.54% respectively, forming the primary channels of cognition, as presented in Figure 4. They have high evaluations of cultural experiences such as “Secret Gardens” and “Spring Tea Holy Land”. Regarding willingness to pay, over 60% of respondents are willing to pay for in-depth cultural experiences (29.85% absolutely willing, 45.30% may try), with the acceptable unit price mainly ranging from 50 to 100 yuan (44.58%), reflecting their preference for cost-effective and culturally rich experience projects.

Public perception of ancient towns in Jiangnan. It is widely believed that the ancient towns in Jiangnan suffer from serious homogeneity of shops, lack of distinctive IP, and weakened authentic life scenes. At the same time, it is pointed out that the lax management and insufficient application of digital technology weaken the cultural attraction.

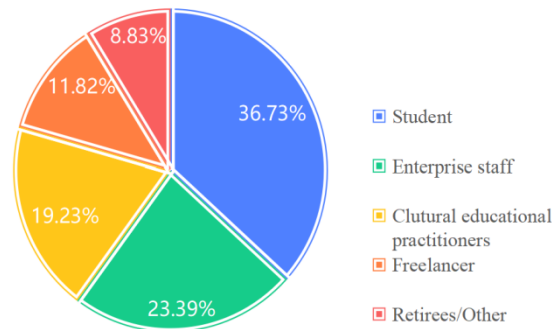


Figure 3 Occupational distribution.

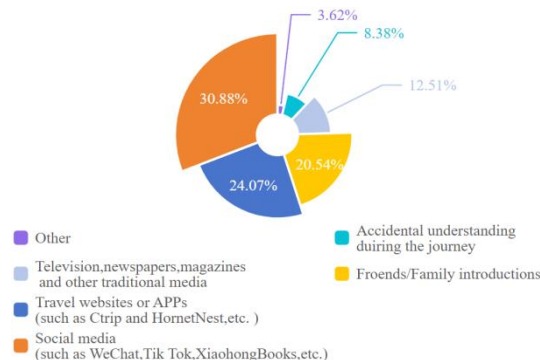


Figure 4 Channels for visitors to learn about Huishan Ancient Town.

#### 4.4 Current Status of Cultural-Commercial-Tourism Integration and Digital-Intelligent Integration Efficiency

Performance score of cultural, commercial and tourism integration. The scores for the integration of culture, commerce and tourism are mostly concentrated in the range of 3-4, and the overall level is medium. Among them, the score of “unique innovation of business format” is the lowest, and the “commercial facilities of cultural venues” are relatively good, reflecting the obvious homogeneity of business format and the lack of distinctive innovation, as can be seen in Figure 5.

The promoting effect of digital intelligence on the integration of culture, commerce and tourism. More than half of the tourists actively participated in AR experience, and more than 70% of them believed that digital and intelligent projects would enhance their willingness to visit again, indicating that digital and intelligent means effectively enhanced interactive experience and tourist engagement.

Priority areas for integrated development. More than half of the tourists believe that the digital development of scenic spots is insufficient, and priority should be given to strengthening the implementation of digital and intelligent technology and business innovation, with the focus on improving the transformation of cultural resources, technology integration and experience of intangible cultural heritage.

#### 4.5 Evaluation of Cognitive and Applied Digital and Intelligent Methods

Digital and intelligent infrastructure experience. Tourists gave the infrastructure, such as network coverage and smart navigation, a moderate rating. During peak hours, the network was prone to lagging, and the service terminals had a high failure rate. The display should prioritize optimizing network quality and device reliability.

Digital and intelligent marketing channels. Tourists show strong preference for short video platforms and Xiaohongshu, with short videos and illustrated guides being the most appealing. There is particular interest in cross-border collaborations like ‘ancient town × tech brand AR check-in’, reflecting young people’s preference for visually engaging and interactive digital marketing formats, as shown in Figure 6.

Attractiveness of digital and intelligent experience projects. AR historical reconstructions, interactive experiences with intangible cultural heritage, and 3D digital exhibition halls are the most popular among visitors. In smart services, consumer recommendations and crowd guidance are in high demand, with highly interactive and practical digital experiences being particularly appealing.

Digital and intelligent management efficiency evaluation. The efficiency of digital and intelligent management is generally moderate. The merchant evaluation system is rated as good, but the real-time control ability of customer flow monitoring and facility scheduling is weak, and dynamic response and resource allocation are still the weak points of management.

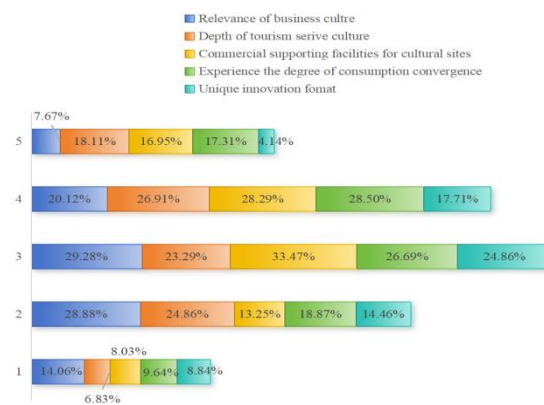


Figure 5 Performance Score of Cultural-Commercial-Tourism Integration.

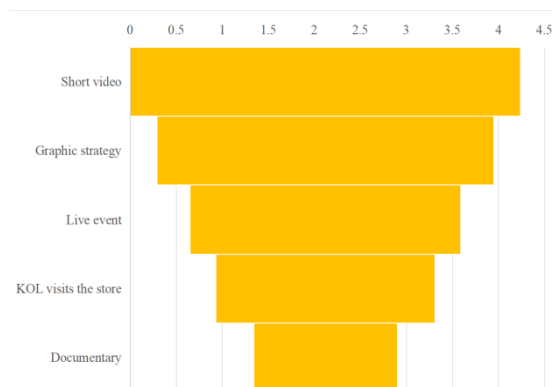


Figure 6 Attractiveness Score of Promotion Formats.

## 5. Conclusion and Suggestion

### 5.1 Conclusions

This study examines how digital intelligence facilitates the integration of culture, commerce, and tourism in Huishan Ancient Town. Survey findings reveal strong tourist interest in interactive digital offerings—such as AR historical reconstructions, intangible cultural heritage experiences, and smart visitor services—while short videos and social media effectively engage younger audiences. However,

infrastructure issues like unstable network coverage and device failures, along with weak real-time monitoring and scheduling systems, hinder the experience. To advance integration, priorities include upgrading digital infrastructure, building unified data platforms, and enhancing dynamic management capabilities.

### **5.2 Optimization Suggestions**

Huishan Ancient Town has made initial progress in digital and intelligent development. However, how to further tap into the town's potential and achieve sustainable development in this digital wave has become a pressing issue. The following optimization suggestions are proposed from four dimensions: digital and intelligent infrastructure, digital marketing, digital experience, and smart facilities.

Strengthen the intelligent facility network to realize dynamic passenger flow scheduling. To alleviate congestion during peak hours, we propose establishing a comprehensive digital infrastructure network for Huishan Ancient Town. The solution focuses on hardware upgrades through an integrated "air-space-ground" approach: deploying 5G micro base stations and Wi-Fi6 hotspots for seamless coverage, installing edge computing nodes to enable local processing of payments, reservations, and ticket verification for faster response times, and standardizing interfaces to integrate data from ticketing systems, merchants, security, and parking facilities. A centralized control system will monitor real-time capacity and automatically implement crowd management measures like flow diversion, capacity limits, and window expansion to resolve congestion at the source. Guided by the principle of "peak-valley flow diversion and dynamic balance," this initiative aims to build a smart infrastructure network that drives sustainable tourism development in the ancient town.

Build a global narrative hub and activate digital and intelligent communication paths. "Culture is the soul of tourism, and tourism is the vehicle of culture." Huishan Ancient Town should establish a unified content platform to standardize digital assets from its ancestral halls, Erquan Spring, and clay figurine IPs. These assets should be creatively adapted according to platform features and audience preferences. By integrating OTA and social media APIs, the platform can deliver targeted content through three-tier tagging (interest, context, purchasing power). Investments will automatically pause when ROI falls below thresholds, while festival content will be replayed post-holiday with NFT-based re-sales. This extended lifecycle strategy amplifies marketing impact, effectively converting engagement into foot traffic and sales growth, achieving synchronized expansion of both visibility and revenue.

Create immersive interactive experiences and enhance cultural communication. The deep integration of culture and tourism serves as both an "accelerator" for industrial transformation and a "practical platform" for the inheritance and innovation of traditional culture. Huishan Ancient Town should center its efforts on cultural storytelling while leveraging digital technologies to build a multi-layered interactive experience system. This involves deploying AI-powered tour guides in ancestral halls, introducing motion capture technology for real-time interactive scoring, generating personalized digital collectibles, and creating immersive theaters in Jichang Garden. Through these diverse scenarios, static cultural resources can be transformed into "immersive, co-creative, and memorable" experiences that strengthen emotional connections between visitors and cultural heritage, ultimately enhancing consumer engagement and brand loyalty.

Optimize data-driven mechanisms to improve the effectiveness of fine governance. We are building a real-time, precision big data platform that integrates with major tourism review systems to capture visitor feedback from Huishan Ancient Town. Through intelligent analysis and categorization, the platform promptly identifies negative reviews and issues early warnings. By publicly tracking processing progress and allowing real-time complaint status checks, we enhance management transparency. By deeply analyzing feedback data to understand tourist preferences and needs, we provide data-driven support for scenic area management decisions. This enables optimized spatial planning and service adjustments, shifting from reactive "post-incident response" to proactive "pre-incident intervention". Replacing experience-based judgments with data-driven governance, we reduce operational fluctuations and improve overall management efficiency.

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