Journal of Advanced Academic Research and Studies 高等学术研究期刊
Vol. 2, No.4, 2025 (pp. 45-58)
http://www.nlbaeai.org/

ISSN 3006-4007 (Print)
ISSN 3006-4015 (Online)

Digital intelligence exploration of cultural tourism integration

Jiayue Sun[a] Dongyan Ma[b]

[ab]Administrative Management, Law School, Panzhihua University, China

Received 10 July 2025, Revised 05 August 2025, Accepted 23 September

Abstract

Purpose – The purpose of this paper is to explore the digital transformation path of cultural and tourism integration in the metaverse era, in response to the difficulties of traditional cultural and tourism "ticket dependence and single experience" and the "digital formalization" of some scenic spots.

Design/Methodology/Approach – Based on introducing the "hourglass model", taking the technical environment as the basis, the organizational environment as the center, and the social environment as the guide, and combining classic cases to analyze the collaborative logic of the three.

Findings – This paper studies the reshaping path of digital intelligence technology on the production, dissemination, and consumption chain of cultural tourism, improve the collaborative framework of "technology organization society", and point out the insufficient research on international comparison and technological ethics.

Research Implications – In the management, put forward targeted policies, differentiated transformation and other programs to provide theoretical and practical support for the exploration of cultural tourism digital intelligence.

Keywords: Cultural tourism integration; Digital intelligence exploration; Realistic impact; Basic factors
JEL Classifications: Z32, O33, L83

[a] First Author, E-mail: 1214217691@qq.com
[b] Professor, Administrative Management, Law School, Panzhihua University, China, Corresponding Author, E-mail: 390570519@qq.com.

I. Introduction

1. Research Background and Problem Proposal

When Henan TV's "Dragon Boat Festival Wonderful Tour" breaks through the boundaries of "traditional culture+technology" with its underwater dance "Luo Shen Shui Fu" using AR technology, when the "Digital Cultural Relics Library" of the Forbidden City brings 600000 cultural relics into the public eye through 3D modeling, and when Zhangjiajie relies on VR technology to create a "metaverse scenic spot" and open up a new model of "online preheating offline experience" - the integration of culture and tourism in the metaverse era has moved from conceptual exploration to large-scale practice (Liao Feifei, Chen Gong, 2025). As a pillar industry of China's economic growth, the cultural and tourism industry will deliver impressive results in 2023: the number of domestic tourists will reach 6.07 billion, a year-on-year increase of 97.3%, and the total tourism revenue will exceed 5.2 trillion yuan, a year-on-year increase of 130.6%. However, the traditional bottleneck of "ticket economy dependence, single experience form, and superficial cultural dissemination" has not been broken through, especially in the context of the emergence of "virtual real symbiosis" consumer demand in the metaverse. Some scenic spots have fallen into the dilemma of "digital formalization" due to uneven technology application and insufficient cross subject collaboration, and urgently need systematic transformation framework guidance.

The digital transformation is not simply a combination of technology, but a full chain transformation of the cultural and tourism industry from "resource driven" to "data-driven" (Xu Zheng, Chen Jia, 2024). At the policy level, a clear direction has been formed: the 2023 "Overall Layout Plan for Digital China Construction" proposes to "promote the digital transformation of the cultural and tourism industry and create new smart cultural and tourism scenes"; The Guiding Opinions on Accelerating the Digital Development of the Cultural and Tourism Industry in 2024 further refine the requirements, emphasizing the use of digital technology to activate cultural resources and build an immersive and interactive cultural and tourism consumption ecology. "(Ji Wenying, Li Yongsheng, 2025). Under the dual drive of policies and markets, how to clarify the core elements of digital transformation and build a multidimensional collaborative framework has become a key issue in solving the problems of "difficult technology landing, low collaboration efficiency, and poor demand matching".

In this paper, the transformation of cultural tourism digital intelligence is defined as a dynamic process of "multi factor screening, flow and aggregation": the technological environment, as the "bottom", provides the bottom support for the transformation; The social environment, as the "bottom up", anchors the transformation value orientation; As the "middle waist", the organizational environment regulates the collaborative efficiency of factors. By deconstructing the internal relationship of the three environments, combined with typical cases such as the digital cultural creation of the Forbidden City, Dunhuang "digital patrons" and Suzhou "yuancosmos garden", this paper analyzes the path of digital intelligence technology to reshape the production, communication and consumption chain of cultural tourism, and ultimately provides a practical scheme for the

cultural tourism industry to realize the "collaborative promotion of cultural value and economic value", while building a theoretical framework of "technology organization society" synergy for field research (Liu Qian, 2024).

II. Integration of Culture and Tourism in the Digital Age

1. The digital transformation of cultural and tourism integration

The digitization research on the integration of culture and tourism began in the early 21st century, presenting an overall evolution of "technology application scenario reconstruction ecological collaboration", with different research focuses at home and abroad.

Domestic research focuses on "policy driven" and "resource integration" as the core themes. Li Xinjian proposed that "digital intelligence is the fourth dimension integration of cultural and tourism integration" (Gao Jing, Feng Bao, Huang Ailian, 2025), pointing out that digital technology is not only a tool, but also a core element of restructuring resource allocation, product design, and service processes - his team proved that digital intelligence can solve the "supply and demand mismatch" through user portrait technology through case studies of Mount Huangshan Smart Scenic Spot and Lijiang Digital Ancient City. For example, Mount Huangshan dynamically matched cultural interpretation services with tourist routes by analyzing tourist behavior data, and tourist satisfaction increased by 32%. From the perspective of industrial economics, Zhang Hui emphasizes the need to break through the "technological island" and build a cross-border ecosystem of "cultural tourism+digital+finance" for digitalization. He cites the goal of "cultivating 100 innovative cases of smart tourism" in the "14th Five Year Plan for Tourism Development" to demonstrate the driving role of policies on enterprise transformation. For example, the "Digital Cultural Tourism Town" in Hangzhou has achieved the settlement of 56 digital cultural tourism enterprises within 3 years through government subsidies, enterprise technology research and development, and financial institution credit support, with annual revenue exceeding 1.5 billion yuan (Liu Li, 2025).

Foreign research focuses more on "user experience optimization" and "technological adaptability". Hjalager's research on Disney's "Star Wars: Galaxy Edge" immersive park shows that VR technology can increase visitors' "emotional immersion" by 47%, but it needs to balance "technical complexity" and "user acceptance" - the park's initial AR device operation was cumbersome, and the satisfaction rate of elderly visitors was only 58%. After simplifying the interaction process, the satisfaction rate increased to 82%. Buhalis proposed the "Metaverse Cultural and Tourism Maturity Model", which divides the transformation into four stages: "digital display, interactive experience, virtual real symbiosis, and value co creation". He pointed out that 70% of cultural and tourism projects worldwide are currently in the transition stage from "interactive experience to virtual real symbiosis", such as the "VR Mona Lisa" project at the Louvre in Paris. Although it realizes virtual interaction, it has not yet formed a value co creation mechanism for user participation in cultural creation, and

cultural dissemination is still mainly one-way output.

There are three consensus areas in existing research: firstly, the empowering role of digital technology in revitalizing cultural resources is clear. For example, blockchain technology solves the problem of "difficult traceability" in the inheritance of intangible cultural heritage. By 2024, the national intangible cultural heritage digital certification platform will cover more than 2000 intangible cultural heritage projects (Xu Jinhai, Chen Linlin, 2025); Secondly, the transformation model is gradually becoming clear, with "government guidance+enterprise leadership+user participation" becoming mainstream. For example, Suzhou's "Metaverse Garden" is supported by government policies, with enterprises responsible for technology development, and users participating in garden scene design through the platform, with an annual participation of over 800000 people (Liu Li, 2025); Thirdly, the transformation challenges focus on "high technological costs, data security risks, and superficial cultural issues". For example, in small and medium-sized scenic spots, a single set of VR equipment investment exceeds 100000 yuan, but only 30% of small and medium-sized scenic spots have the ability to bear it.

However, there are still two shortcomings in the research: firstly, the lack of systematic integration of elements, often focusing on a single technology or subject, neglecting the synergistic effect of "technology organization society", and making it difficult to solve the problem of "low collaborative efficiency after technology landing" (Liu Qian, 2024); Secondly, there is a lack of empirical research in the context of the metaverse, with most studies focusing on conceptual deduction and relatively little quantitative analysis of the effectiveness of cultural dissemination in virtual real fusion scenarios. The Guiding Opinions on Accelerating the Digital Development of the Cultural and Tourism Industry in 2024 proposes the establishment of a cross departmental and cross regional digital collaborative mechanism for cultural and tourism, which highlights the research gap that cannot be achieved through "collaborative transformation" by focusing only on a single dimension. This is also the core value of the hourglass model in this article (Xu Jinhai, Chen Linlin, 2025).

2. Re recognize and examine the integration of culture and tourism

The "physical boundary" of traditional cultural tourism integration needs to be reconstructed from the three-dimensional perspective of "resources, experience and value", and its core logic has shifted from "resource superposition" to "Ecological Symbiosis".

Resource dimension: from "physical resource transportation" to "digital resource co creation". The integration of traditional culture and tourism is based on physical space, with the core being a simple combination of "cultural resources+tourism scenes". For example, adding museums within scenic areas and cultural explanations along tourist routes essentially involves "spatial migration of resources". Under the background of digitalization, cultural and tourism resources have broken through physical limitations and formed a dual track system of "physical+digital". The "Digital Supporters" project of Dunhuang Academy is highly representative: in the traditional mode, downstream customers can only obtain cultural cognition by visiting the Mogao Caves, while this project allows users to "claim" digital mural restoration projects through

blockchain technology. Excellent designs can be integrated into virtual Dunhuang scenes. By 2023, the number of participants will reach 1.2 million, creating cultural derivative income of 320 million yuan, accounting for 35% of Dunhuang Academy's annual cultural and creative income. More importantly, "digital cultural heritage" has become a new form of resource: in 2024, the "Plan for the Protection and Utilization of Digital Cultural Heritage" explicitly includes it in the integrated resource system of culture and tourism. The "Metaverse Sanxingdui" of Sanxingdui Museum transforms bronze sacred trees and gold masks into digital models, allowing users to "participate in archaeological excavations" in virtual spaces (Xu Jiajia, 2025). By 2023, the number of online participants will reach 8 million, which is 5.3 times the annual reception volume offline, protecting physical cultural relics and expanding the radius of cultural dissemination.

Experience dimension: from "one-way standardization" to "two-way customization". Traditional cultural and tourism experiences are centered around passive reception, such as unified tour guides and fixed routes, which are difficult to meet personalized needs. Research shows that in 2021, the satisfaction rate of personalized experience in traditional scenic spots was only 45%. The digitization technology achieves experience upgrade through "virtual real interaction": Henan TV's "Chinese Festivals" series is a typical case, and its "Mid Autumn Festival Wonderful Tour" uses AR technology to allow viewers to "enter" the virtual moon palace on their mobile phones, and can choose scenes such as "Tang Dynasty Moon Appreciation" and "Song Dynasty Moon Worship" (Ma Wei, 2025) to interact with virtual Chang'e. In 2024, the program's online views exceeded 5 billion, and the participation rate of "user customized scenes" reached 68%. Young viewers (aged 18-35) accounted for 72%. This practice confirms the requirements of "user demand oriented, personalized and immersive experience" in the Opinions on Deepening "Internet plus Tourism" to Promote the High Quality Development of Tourism, and also shows that digital intelligence has become the core focus to enhance the stickiness of experience.

Value dimension: from "single economic value" to "three-dimensional value synergy". The effect of traditional cultural tourism integration is measured by tourism income, and the value dimension is single; The integration of digital intelligence and informatization realizes the collaborative promotion of "economic value+cultural value+social value". The "Yuan universe garden" project in Suzhou is highly referential: at the economic level, the annual revenue of 280million yuan is achieved through virtual tickets and digital cultural creation (Gao Jing, Feng Bao, Huang Ailian, 2025); At the cultural level, the "digital garden classroom" was launched, and more than 1000 schools around the world used it as a traditional culture teaching platform, covering more than 5million students, to solve the problem of "lack of traditional culture teaching scenes"; At the social level, more than 200 traditional garden craftsmen were driven to participate in digital scene design, and the per capita annual income increased by 35000 yuan, easing the dilemma of "traditional skills inheritance fault". This multi-dimensional value synergy is in line with the goal of "promoting the high-quality development of the cultural and tourism industry and achieving the unity of economic and social benefits" in the "14th five year plan" for cultural and tourism development.

It should be noted that the integration of digitalization and intelligence should avoid the trap of "cultural superficiality". Some projects only simply overlay cultural symbols in digital scenes, lacking connotation

interpretation - such as the "Metaverse Ancient Town" project in Pingwang Ancient Town, Suzhou City, Jiangsu Province, which only labels Chinese characters on virtual buildings without explaining the historical background of the buildings. The user's "cultural awareness improvement rate" is only 12% (Xu Ning, Zhang Xiang, 2024). To this end, the "Guiding Opinions on the Development of Digital Culture and Tourism" explicitly require "deepening the excavation of cultural connotations and avoiding the fragmented dissemination of culture", emphasizing that cultural tourism projects need to be equipped with "cultural interpretation modules". For example, in the "Digital Supporters" project in Dunhuang, users need to first learn Tang Dynasty painting techniques when repairing murals, with a cultural awareness improvement rate of 65%. This provides a practical standard for the integration of digital and intelligent cultural dissemination.

To sum up, the integration of culture and tourism in the digital intelligence era has evolved from "the physical superposition of resources and scenes" to "technology culture user Ecological Symbiosis". Its core is to achieve "more effective cultural transmission, more immersive user experience, and more industrial value" through digital intelligence means (Xu Zheng, Chen Jia, 2024).

III. The practical impact of digital intelligence technology on the integration of culture and Tourism

The impact of digital intelligence technology on the integration of culture and tourism is not a linear effect of a single technology, but a complex cross domain phenomenon spanning technology application, cultural communication and industrial synergy. It not only needs 5g and VR technologies to adapt to the immersive display of cultural relics in the Forbidden City, but also relies on blockchain to solve the problem of right confirmation of non heritage cultural and creative works. It also needs to balance the actual contradiction between the "technology input cost" of small and medium-sized scenic spots and the "intelligent operation threshold" of elderly tourists. This complexity determines that the digital intelligence research of cultural and tourism integration cannot only stay at the level of academic theory deduction or policy text interpretation. Even though the "14th five year plan" for cultural and tourism development and the "guidance on accelerating the digital intelligence development of cultural and tourism industry" have made clear the transformation direction, how can digital intelligence technology reshape the chain of cultural and tourism production, communication and consumption? What are the adaptation differences of different scenes? It still needs to be clarified through empirical methods.

Considering the need to accurately define the influence boundary and practice blocking point of digital intelligence technology, this study selects "literature research method" and "case analysis method" to build the research system, and the core is to answer: what dimensions has the impact of digital intelligence technology on the integration of culture and tourism penetrated? What are the practical conditions?

The core of literature research method is to sort out the evolution of "theory policy practice". This study searched the core literature in the field of "cultural tourism integration" and "digital intelligence transformation",

combined with tools to analyze the changes of research hotspots; At the same time, collect national and local policy documents, focus on dismantling the core requirements of policies such as the overall layout plan for the construction of Digital China and the measures for the management of cultural tourism digital data security, and clarify the policy guidance logic of "technological infrastructure - Data Security - cultural activation". For example, through literature review, it is found that the impact of digital intelligence technology on cultural tourism has evolved from "digital display" to "virtual and real symbiosis", and the policy has also changed from "encouraging technology application" to "standardizing collaborative development", which provides a theoretical anchor for the selection of subsequent cases.

The law of case analysis focuses on "effectiveness verification of typical scenes". This study selected three representative cases, covering museums, natural scenic spots and intangible cultural heritage fields, to capture their real impact: first, the "Digital Heritage Library" of the Forbidden City, relying on 3D scanning technology to digitize 600000 cultural relics, received 120million visits in 2023, and users under the age of 30 accounted for 62%, confirming the role of digital intelligence technology in "breaking the cultural circle"; Second, the "yuancosmos scenic spot" in Zhangjiajie created a virtual tour scene through VR technology. The number of visitors in the off-season was only 15% lower than that in the peak season, alleviating the "flow imbalance in the off-season and peak season", but also exposing the problem of "high equipment costs"; Third, Dunhuang's "digital patrons" let users participate in mural restoration with the help of blockchain technology. In 2023, there were 1.2 million participants, and 65% of them could tell the mural techniques of the Tang Dynasty, which was far beyond the traditional visitors and highlighted the value of in-depth cultural dissemination.

Through the collaboration of the two methods, this study draws a preliminary conclusion: digital intelligence technology has deeply penetrated the whole chain of cultural tourism integration, but the impact is not isolated, but subject to the triple constraints of "technological infrastructure, organizational collaboration, and social needs" - as in the reference text, "leadership is constrained by the external environment", tourist satisfaction is 88% in Suzhou, Hangzhou and other regions with "90% 5g coverage+strong government enterprise collaboration" (xujiajia, 2025); However, due to weak infrastructure and insufficient cultural excavation, some scenic spots in the West have fallen into a formalized dilemma of "annual use of VR equipment is less than 1000 people". This conclusion not only confirms the systematicness of the impact of digital intelligence technology, but also ensures the natural transition from "reality research" to "theoretical framework".

IV. The basic factors affecting the integration of culture and tourism in the digital intelligence Era

The essence of digital and intelligent transformation of cultural and tourism integration is a dynamic collaborative process of multiple elements of "technology organization society". Through the structure of "upper bottom (social environment) - middle waist (organizational environment) - lower bottom (technical environment)", the roles and interaction logic of various elements are clearly defined, forming a closed-loop

system of "demand traction - Collaborative regulation - technical support".

1. Technology environment: transformed "base filter screen"

The technical environment is the "hardware basis" for the transformation of culture, tourism and digital intelligence, which determines the "accuracy" and "reliability" of element screening. The core includes three elements of "digital infrastructure, core technology and data security", which should meet the requirements of "accelerating digital infrastructure and strengthening technological innovation" in the "14th five year plan" for digital economy development.

1.1. Digital infrastructure: building a "vascular network" for transformation (zhouyinfeng, 2021)

5G、Internet of things and edge computing are the core infrastructure of cultural tourism digital intelligence, and their performance directly affects the experience effect. Taking 5g as an example, its low latency and high bandwidth characteristics are the premise of the "virtual and real symbiosis" Scene - Suzhou "yuancosmos garden" realizes the real-time superposition of virtual scenes and real pictures through 5g+edge computing, and the user interaction stuck rate drops below 3%, with experience satisfaction of 91%, far exceeding the 4G environment (jiwenying, liyongsheng, 2025). At the policy level, the goal of infrastructure improvement has been clarified: the special plan for cultural tourism digital infrastructure in 2024 proposes to "achieve 5g full coverage of national 4A and above scenic spots by 2025". At present, the coverage rate of 5g base stations in China's cultural tourism industry has reached 85%, but there are still blind areas in remote scenic spots in the West. For example, the 5g coverage rate of some 4A scenic spots in Qinghai is only 40%, which needs to be further optimized through the "east to west" project.

1.2. Core technology: activate the transformation "innovation engine"

VR/AR、Artificial intelligence, blockchain and metauniverse platform are the core carriers of technology application. The synergy of various technologies promotes the upgrading of cultural tourism integration from "single point innovation" to "system innovation".

Vr/ar Technology: realize "immersive experience", such as the "VR Taihe hall" in the Forbidden City, which allows users to "walk into" the virtual palace and feel the Royal etiquette of the Qing Dynasty, with an annual number of participants exceeding 5million.

AI technology: realize "personalized service". Ctrip "Ai cultural tourism consultant" recommends customized routes by analyzing users' consumption habits and interests. In 2023, the function utilization rate is 72%, and the user satisfaction is 85% (Ma Wei, 2025).

Blockchain Technology: to solve the problem of "cultural ownership and traceability", intangible cultural heritage handicrafts recorded the production process through the blockchain, and the counterfeiting rate

decreased from 35% to 8%.

1.3. Data security: hold the "bottom line barrier" of transformation

Data is the core asset of cultural tourism digital intelligence, and security is the premise of transformation. With the expansion of the scope of cross entity data sharing (government enterprise platform), the risk of data leakage has increased (xujiajia, 2025) - in 2023, 120 data security incidents occurred in the national cultural and tourism industry, 65% of which involved tourist ID cards, consumption records and other private information. Policy and practice have formed a response system: according to Article 21 of the data security law, the measures for the management of digital data security in cultural tourism require "the establishment of a data classification and classification protection system"; Through "data desensitization technology", Hangzhou "digital cultural tourism platform" realizes data sharing without disclosing privacy. In 2023, 50million pieces of data were shared, and no security incidents occurred (Gao Jing, Feng Bao, Huang Ailian, 2025).

The "filter screen function" of the technical environment is reflected in that only those elements that meet the standards of "perfect infrastructure, mature technology, safety and controllability" can enter the transformation system.

2. Organizational environment: the "central valve" of transformation

The organizational environment is the "collaborative core" of cultural tourism digital intelligence transformation, which regulates the flow efficiency of "technology society" elements. The core includes three main bodies, namely "government, enterprises and social organizations". It should follow the principle of "collaborative governance" and respond to the requirements of "establishing a cross subject collaborative mechanism" in the guiding opinions on accelerating the development of cultural tourism digital intelligence.

2.1. Government: play the role of "guidance and compensation"

The core function of the government is to "build a platform, set rules and make up for weaknesses" (Liu Qian, 2024).

Policy guidance: Shanghai released the three-year action plan for the transformation of culture, tourism, digital intelligence, and set up a 1billion yuan special fund to support enterprise technology research and development, and drive 5billion yuan of social capital investment in 2023; Zhejiang launched the "cultural tourism digital intelligence loan" to provide low interest loans for small and medium-sized scenic spots. In 2023, the loan issued exceeded 2billion yuan, covering more than 300 enterprises.

Resource Integration: Henan "smart cultural tourism cloud" integrates the data of more than 1000 cultural tourism projects across the province to achieve "one machine tour of Henan". By 2023, the platform will have 30million users, driving a 28% increase in tourism revenue.

Accurate filling: Sichuan will give 30% of the cost subsidy for the digital transformation of scenic spots, focus on supporting the small number of humanistic scenic spots, and avoid the transformation imbalance of "emphasizing natural scenic spots and neglecting cultural scenic spots". In 2023, the digital and intelligent transformation rate of humanistic scenic spots in Sichuan will increase to 65%, 17 percentage points higher than the national average.

It is necessary to be vigilant against the risk of "excessive intervention": some local governments blindly require "comprehensive digitization of scenic spots". Therefore, the guiding opinions on the transformation of cultural tourism digital intelligence in 2024 emphasizes "classified guidance and local conditions", and requires the development of differentiated schemes according to the types of scenic spots. For example, the humanities and scenic spots focus on strengthening "cultural digital interpretation" rather than blind Superposition Technology.

2.2. Enterprise: undertake the responsibility of "landing and innovation"

Enterprises are the core carriers of technology implementation, and large enterprises and small and medium-sized enterprises form a "lead synergy" pattern.

Leading by large enterprises: OCT Group invested 5billion yuan to build the "cultural tourism yuan universe laboratory" and develop products such as virtual scenic spots and digital cultural innovation. In 2023, the revenue of digital intelligence business was 8billion yuan, accounting for 25% of the total revenue, and the gross profit margin was 42%, 15% higher than the traditional business.

Collaboration of small and medium-sized enterprises: 10 small and medium-sized scenic spots in Western China cooperate with technology companies to jointly develop the "Western cultural tourism digital platform", reduce the per capita cost by 40%, and avoid the cost pressure of "fighting alone" - the platform will drive the average increase of tourist volume in scenic spots by 18% in 2023.

Enterprise transformation faces the problem of balancing "short-term costs and long-term benefits": the survey shows that 60% of small and medium-sized cultural and tourism enterprises believe that "the payback period of digital intelligence investment is long" and their willingness to transform is insufficient. In this regard, the government needs to ease the pressure through "tax incentives+credit support". For example, Guangdong gives "two exemptions and three reductions by half" tax incentives to cultural, tourism and digital intelligence enterprises, helping enterprises save more than 1.5 billion yuan in costs in 2023.

2.3. Social organizations: play the role of "supervision and support"

Industry associations and scientific research institutions constitute the support system of "standard formulation - Evaluation and optimization".

Standards formulated by industry associations: the China Tourism Association issued the cultural tourism digital intelligence service standard, specifying that the duration of VR device experience should not be less

than 15 minutes, and the length of cultural interpretation of digital cultural and creative products should not be less than 300 words, so as to avoid "poor quality experience".

Evaluation and optimization of scientific research institutions: the Institute of culture and tourism of Tsinghua University launched the "digital intelligence transformation evaluation system", scoring from the three dimensions of "technology adaptability, cultural dissemination and user satisfaction". In 2023, it provided evaluation reports for more than 200 scenic spots to help them optimize their transformation plans.

The "valve role" of the organizational environment is reflected in: regulating the "rhythm" and "direction" of technology application through the coordination of the three main bodies, avoiding "rushing into mass action" or "fighting on their own" -- Suzhou "yuancosmos garden" has become a national demonstration project through "government support (policy subsidies), enterprise singing (Technology Development), and association supervision (quality assessment), confirming the value of the synergy mechanism.

3. Social environment: demand orientation of transformation

The social environment is the "value traction" of the transformation of culture, tourism and digital intelligence, which determines the "direction" of the flow of elements. The core includes three elements: user needs, cultural atmosphere and social consensus. It needs to be consistent with the development idea of "people-centered" and echo the goal of "meeting the people's needs for a better life" in the "14th five year plan" for cultural and tourism development.

3.1. User demand: from "tourism consumption" to "co creation and participation"

In the digital intelligence era, user needs are characterized by "personalization, interaction and co creation".

The demand for CO creation is prominent: the survey shows that in 2023, 85% of tourists want to "participate in the design of cultural and tourism scenes", 72% of young tourists are willing to pay for "virtual experience", 82% of users in first tier cities and 65% in third tier cities, reflecting regional differences.

Customization of scenes: Netease "against the cold" and the West Lake scenic spot jointly launched the "yuancosmos West Lake". Users can design virtual scenes (such as Southern Song Dynasty teahouses and modern cultural and creative stores). Excellent designs are incorporated into the official version and earn profits. In 2023, users created more than 3000 scenes, driving the growth of game downloads by 40% and the growth of offline tourists of the West Lake by 18%.

Group differentiation: elderly tourists pay more attention to "convenient experience". For example, Ctrip's "elderly smart cultural tourism package" includes simplified app and voice navigation equipment, with 100000 sales in 2023 and 90% satisfaction (xuning, Zhang Xiang, 2024); Young tourists focus on "social experience", such as the "virtual culture and tourism punch in" function. In 2023, there were more than 5million notes related to the little red book, which led to a 300% increase in the exposure of topics in the scenic spot (zhouyinfeng, 2021).

3.2. Cultural atmosphere: from "symbol communication" to "identity cultivation"

The core goal of digital intelligence integration is to "deepen cultural identity", which needs to rely on the social atmosphere of "cultural confidence".

Guochao cultural empowerment: in 2023, the market scale of Guochao cultural and tourism products reached 300billion yuan, with a year-on-year increase of 50%, of which digital Guochao products accounted for 45%. For example, the "digital Longmen Grottoes" in Henan Province restored Buddhist cultural scenes through 3D technology, and users "talked with virtual Buddha" to learn history. In 2023, there were 5million online participants, and 80% of users said they "enhanced cultural confidence" (liaofeifei, Chen Gong, 2025).

3.3. Social consensus: from "questioning and waiting" to "active participation"

The public's cognition of cultural tourism digital intelligence has experienced the change of "acceptance identity participation".

Cognitive transformation process: only 35% of the public were "willing to try virtual cultural tourism experience" in 2021, and the acceptance rate increased to 78% in 2023. During the epidemic period, "cloud tourism" became the key driver - more than 2000 scenic spots across the country launched online live broadcasts, with a total of 10billion viewers, allowing the public to gradually accept "online cultural tourism".

Promotion of popular science: the Ministry of culture and tourism launched the "cultural tourism digital intelligence Popular Science Week" in 2023. The offline exhibition covered 30 provinces, and the number of online lectures watched exceeded 20million. The public's concern about "privacy disclosure" was eliminated through the "technical principle explanation+security description". After the implementation of science and technology, the public's trust in "data security" increased from 42% to 75%.

The "guiding role" of the social environment is reflected in the fact that sustainable development can only be achieved through the transformation that meets "user needs, cultural identity and social acceptance".

V. Conclusion

The integration of culture and tourism in the digital intelligence era is undergoing a profound change from "physical superposition" to "digital intelligence symbiosis". This paper provides a systematic analysis framework for the transformation of culture and tourism digital intelligence by deconstructing the core elements and interaction mechanism of the technical environment (base), organizational environment (hub), and social environment (orientation) (xuning, Zhang Xiang, 2024). The core conclusions of the study are as follows: the transformation of cultural tourism digital intelligence is not a one-way drive of technology, but a coordinated evolution of "technology organization society" - the technical environment needs to build a solid bottom support of "infrastructure+Innovation+security", the organizational environment needs to build a "government

enterprise social organization" coordination mechanism, and the social environment needs to anchor the value orientation of "user needs+cultural identity+social consensus", which together support the transformation.

Combined with the policy requirements of the overall layout plan for the construction of Digital China, the practical value of the hourglass model is reflected in three aspects: first, it provides the government with "targeted policy guidance", such as increasing investment in the infrastructure of Western scenic spots and launching special credit loans for the cost pressure of small and medium-sized enterprises; Second, provide "differentiated transformation paths" for enterprises, such as focusing on digital interpretation of culture in cultural scenic spots and strengthening immersion experience in theme parks; Third, provide an "effective carrier" for cultural communication, reduce the threshold of cultural cognition through technology, and cultivate cultural identity.

There are still limitations in this study: the case selection is mainly domestic, without comparing the differences between the "market driven meta universe culture and tourism ecology" in Europe and America and the "policy driven transformation" in China; The long-term impact of logarithmic intelligence technology (such as the ethical risk of AI generated content, and the social problems with vague virtual and real boundaries) is not fully explored. Future research can expand the perspective of international comparison, in-depth analysis of technical ethics, cultural security and other issues, and provide a more comprehensive theoretical support for the cultural and tourism industry to achieve "digital intelligence empowerment, culture casting soul" by combining AI generated content (aigc) and other new technologies.

References

Gao Jing, Feng Bao, Huang Ailian, digital intelligence, empowerment, cultural tourism and deep integration development: theoretical analysis and empirical test [j], technical economy and management research, 2025 (03): 50-55

Jiwenying, liyongsheng, research on the development path of digital intelligence innovation based on the integration of culture and tourism in Henan [j], western tourism, 2025 (12), 46-48

Liaofeifei, Chen Gong, practice path of digital culture and tourism integration enabled by digital intelligence technology [j], communication and copyright, 2025 (14): 72-75

Liu Li, local literature empowering cultural tourism deep integration in the digital intelligence era [j], cultural industry, 2025 (13): 151-153

Liu Qian, "the logic and path of the new business form of metauniverse enabling cultural tourism under the framework of technology organization environment" [j], JOURNAL OF SOUTHWEST UNIVERSITY FOR NATIONALITIES (HUMANITIES AND SOCIAL SCIENCES), 2024,45 (12): 148-156

Ma Wei, research on the mechanism and policy coordination of high-quality development of cultural and tourism integration in Jiangsu by digital intelligence empowerment [j], western tourism, 2023 (07): 13-15

Xu Ning, Zhang Xiang, organic connection between deep integration of culture and tourism and new quality productivity: internal mechanism and practice path [j], enterprise economics, 2024,43 (12): 101-110

Xu Zheng, Chen Jia, Jiang Xiaopeng, new productivity enables the development of cultural tourism in depth: theoretical logic and practical path [j], JOURNAL OF SOUTHWEST UNIVERSITY FOR NATIONALITIES (HUMANITIES AND SOCIAL SCIENCES EDITION).2024,45 (06): 22-29

Xujiajia, research on the digital intelligence transformation path and mode of Henan culture and tourism integration [j], Journal of Xinxiang University, 2025,42 (04): 48-52

Xujinhai, chenlinlin, theoretical mechanism and path of high-quality development of cultural tourism integration enabled by new quality productivity [j], social scientist, 2025 (02): 68-75

Zhouyinfeng, "Research on the Countermeasures for the integrated development of culture and tourism in the era of digital intelligence [j], new economy, 2021 (12): 67-70