

Exploration of Digital Intelligence Inheritance of Jingdezhen Ceramic Intangible Cultural Heritage from the Perspective of Cultural and Tourism Integration

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Abstract: Against the backdrop of the in-depth integration of culture and tourism, the inheritance and development of intangible cultural heritage (ICH) are embracing new opportunities as well as challenges. As one of the first entries inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity, the ceramic ICH of Jingdezhen has been incorporated into the key projects of the national cultural digitization strategy, which necessitates breaking its development bottlenecks by virtue of culture-tourism integration and digital technologies. Taking Jingdezhen's ceramic ICH as the research subject, this paper focuses on the core transformation of ICH from static exhibition to digital-intelligent inheritance. Based on the innovative practices of typical cultural-tourism scenarios such as in Taoxichuan, the Imperial Kiln Museum, Sanbao Village and Letian Market, it analyzes the coordinated development of culture-tourism integration and ceramic ICH, explores the paths and modes of ICH's digital-intelligent inheritance empowered by digital technologies, and thus provides a reference for the sustainable development of handicraft-based ICH industries.

Keywords: Cultural and Tourism Integration; Jingdezhen Ceramics; Intangible Cultural Heritage (ICH) Culture; Digital and Intelligent Inheritance.

1. Introduction

Jingdezhen, the millennium-old porcelain capital and the core inheritance hub of China's intangible cultural heritage (ICH) of ceramic craftsmanship, once grappled with developmental bottlenecks such as the shortage of inheritors for its handcrafted porcelain-making techniques, wood-fired kiln firing, and other ICH categories, as well as the inadequate adaptability of traditional products to the modern consumer market. In recent years, driven by both the cultural-tourism integration strategy and digital-intelligent technologies, this traditional handicraft city has undergone an innovative transformation, gradually evolving into a cultural and creative highland that attracts young people in droves. [1]

As a core trend in the development of cultural industries and tourism in the new era, cultural-tourism integration has broken down the industrial barriers between culture and tourism, built a symbiotic ecosystem, and opened up a crucial window for the inheritance and development of ICH handicraft industries. With the intensive introduction of policies such as the 14th Five-Year Plan for the Protection of Intangible Cultural Heritage, ICH handicrafts in this new era are no longer mere words preserved in museum books; instead, they have been transformed into dynamic cultural resources that are experienceable, consumable and transmissible, undergoing profound changes in their inheritance forms and industrial models. [2]

As the millennium-old porcelain capital, Jingdezhen's ceramic ICH embodies the craftsmanship spirit of China's ceramic culture. Meanwhile, the rise of cultural-tourism integration and the popularization of digital technologies have brought transformative opportunities for ceramic ICH. Nevertheless, under the dual impacts of modernization and globalization, Jingdezhen's ceramic ICH is also confronted with inheritance dilemmas.

2. Rationale for the Synergistic Development of Cultural-Tourism Integration and Jingdezhen's Ceramic Intangible Cultural Heritage

2.1. The Main Driving Forces of Development

First and foremost, the core value of Jingdezhen's intangible cultural heritage (ICH) of ceramic art lies in its handcrafted techniques and cultural connotations passed down from generation to generation. However, some of these traditional craftsmanships are currently on the verge of extinction. Take the wood-fired kiln technique as an example: among the thousands of kilns in Jingdezhen today, only more than 20 are wood-fired ones, and there are merely over 30 artisans who have mastered the complete wood-fired kiln firing technique, with an average age of over 60 years old.

Furthermore, ceramic craftsmanship is not only a cultural resource but also an economic resource with great potential. The integration of culture and tourism has broken the single mode of the traditional ceramic industry that prioritized production over experience. The output value of Jingdezhen's ceramic industry has reached 93.9 billion yuan. The output value of Jingdezhen's ceramic-related cultural and tourism sector has surged from 15.6 billion yuan in 2018 to over 75 billion yuan in 2024. Alone, the Taoxichuan Cultural and Creative Block has gathered tens of thousands of young "Jingdrifters" to start their own businesses, driving employment for a large number of people passionate about ceramic culture across the upstream and downstream industrial chains.

Overall, intangible cultural heritage serves as the core symbol of regional cultural identity. Jingdezhen's ceramic ICH embodies the collective memory and cultural pride of the

people in the "Porcelain Capital". Through immersive experiences, the integration of culture and tourism enables both local residents and foreign tourists to deeply perceive the charm of ceramic culture, thereby strengthening social identity and establishing an emotional bond with ceramic culture.

2.2. Feasibility of the Research

Policy support serves as a crucial guarantee for the coordinated development of cultural-tourism integration and ceramic intangible cultural heritage (ICH). Following the establishment of the Ministry of Culture and Tourism in 2018, the 14th Five-Year Plan for the Protection of Intangible Cultural Heritage explicitly proposed "promoting the in-depth integration of ICH and tourism". The People's Government of Jingdezhen issued the Implementation Plan for Jingdezhen National Ceramic Culture Inheritance and Innovation Pilot Zone, which put forward the goal of "building a world-class ceramic cultural tourism destination". It also established a special fund for the development of the ceramic cultural industry, with a focus on supporting the digital inheritance of ICH and the construction of cultural-tourism integration projects.

The application of various digital and intelligent technologies such as augmented reality (AR), artificial intelligence (AI), big data and 5G has enabled traditional craftsmanship to be presented in more vivid forms. Through 3D modeling, historical market scenes are digitally restored, allowing audiences unable to visit in person to experience ceramic-making processes and purchase cultural and creative products online. This approach aligns with the cognitive preferences of modern young groups, thereby boosting the growth of related consumption.

With the improvement of residents' income levels and the transformation of consumption concepts, cultural consumption has become a core demand in tourism consumption. Customized, experiential and high-quality ICH products and services are gaining increasing popularity. Contemporary tourists, especially young ones, are no longer satisfied with purchasing standardized tourist souvenirs; instead, they prefer to participate in ICH experience activities, buy original cultural and creative products, and pursue more in-depth cultural experiences. [3-4]

3. The Current Development Situation of the Intangible Cultural Heritage Industry of Jingdezhen Ceramics

3.1. The Evolution of Protection Methods

The traditional "museum-based" protection model still plays an important role in the protection of Jingdezhen ceramic ICH, but it has evolved from simple physical display to the dual protection of physical objects and digital resources. As a core protection institution, the Imperial Kiln Museum has completed the collection of more than 3,000 selected samples for its ancient ceramic gene bank, covering nearly 1.2 million pieces of genetic information about ancient ceramics. Big data technology is used to extract core information from each sample, including 8 major categories such as shape, decorative pattern, body and glaze, which has promoted a number of research projects on ceramic cultural restoration. Digital-intelligent protection has become the core trend of current ceramic ICH protection, and its essence is to ensure the inheritance of culture in practice and its continuity in daily

life. By building diversified cultural and tourism scenarios, the Jingdezhen Imperial Kiln Museum has realized the digital-intelligent development of ceramic ICH.

3.2. Exploratory Commercial Practices

The integration of culture and tourism has accelerated the commercialization process of Jingdezhen ceramic ICH, with cultural and creative products emerging as the core carrier for industrial development. Jingdezhen has formed a cultural and creative product sales network centered on Taoxichuan, Letian Market, Dragon Pearl Pavilion and Sanbao Village, and the product categories have expanded from traditional porcelain to diversified forms such as ceramic jewelry and household ornaments. For example, Taoxichuan Cultural Tourism Co., Ltd. has carried out university-enterprise cooperation with Jingdezhen Ceramic University to develop China's first blockchain platform for the ceramic industry. Up to now, 327 enterprises have settled on the platform, and the cumulative transaction volume of on-chain porcelain has exceeded 1.5 billion yuan. At the Imperial Kiln Museum located in the Taoyangli Historical and Cultural Block, a cultural and creative IP image named "Suicui Ya" (Broken Porcelain Duck) has been created through digital-intelligent technologies for promotion, and a series of related peripheral cultural and creative products have been designed and produced. The sales volume of these products in the first half of 2024 has exceeded 1.6 million yuan, achieving favorable market feedback. After the Spring Festival was inscribed on the UNESCO Intangible Cultural Heritage List on December 4, 2024, Jingdezhen launched the "Spring Festival Bowl" series with ceramics as the carrier. The official Jingdezhen ceramic flagship store has collaborated with the CCTV Spring Festival Gala on product design, and simultaneously launched the "Spring Festival Inscription Success Commemorative Bowl" series that integrates Jingdezhen ceramics with traditional Spring Festival customs, including 13 styles in total. For the core product "Spring Festival Bowl", 100,000 sets of daily-use basic versions and 1,819 sets of "1819 Limited Collection Versions" have been released. The first batch of 10,000 sets of products has gained 125 million exposures on platforms such as Douyin, WeChat Official Account and Xiaohongshu, with the topic popularity exceeding 80 million, and they were quickly sold out after the launch, winning the favor of consumers. Up to now, the retail sales volume has reached 38,960 sets, with a total market sales volume of 12.24 million yuan. The reappearance of Jingdezhen "Spring Festival Bowl" at the Lantern Festival Gala has triggered a new wave of purchase enthusiasm, making it the new "best-selling product" in Jingdezhen. Empowering industrial development through ICH culture has effectively promoted the innovative design and R&D of Jingdezhen ceramic enterprises, and driven the innovative development of Jingdezhen ICH products.

3.3. Differentiated Patterns of Local Practices

The practice of cultural-tourism integration of Jingdezhen ceramic ICH presents a pattern of "core area-led development". Core cultural and tourism areas such as Taoxichuan, the Imperial Kiln Museum, Sanbao Village and Letian Market have achieved breakthrough development by virtue of their advantages in resources, technology and capital, forming a series of influential cultural-tourism integration brand clusters, which has enhanced the communication power of Jingdezhen in the field of cultural and tourism development.

In sharp contrast to the core areas, the development of ceramic ICH practices in some remote villages of Jingdezhen lags behind. These areas are mostly distributed in the rural areas of Fuliang County and Changjiang District. Although they possess certain traditional porcelain-making workshops and inheritors, their industrialization process is slow due to constraints such as geographical factors, lack of funds, insufficient technology and poor transportation infrastructure. In the context of the accelerated evolution of digital-intelligent technologies, many practical problems that have restricted development in the past are also expected to be solved and eliminated.

4. The Dual Values Endowed by Cultural-Tourism Integration to Jingdezhen's Ceramic Intangible Cultural Heritage

4.1. Inheritance of Craftsmanship: The Continuity of Cultural Value

The essence of cultural-tourism integration lies in the demonstration and transmission of cultural values, and the digital-intelligent inheritance model is gradually becoming a practical path for the activation of Jingdezhen ceramic ICH. Among them, experiential interactions in cultural and tourism scenarios have enabled more people to have the opportunity to contact and learn traditional culture. The ICH workshops in Taoxichuan train an average of 120,000 students annually, of which 30% of the students have expressed their willingness to further study porcelain-making techniques after the experience; the research and study base in Sanbao Village receives more than 4,200 youth research teams every year, with over 200,000 teenagers understanding ceramic craftsmanship through practice, thus reserving potential forces for the inheritance of ICH.

In the context of cultural-tourism integration, ceramic ICH empowered by digital-intelligence has become an emotional bond connecting local residents and foreign tourists, realizing the reconstruction of social identity. For local residents, events such as Taoxichuan Taoran Market and Dragon Pearl Pavilion ICH Festivals are innovatively presented through digital-intelligent means, allowing them to re-recognize the value of ceramic culture. Digital-intelligent immersive experiences have transformed them from "spectators" to "participants", and they can feel the strong charm of ceramic culture in the process of making porcelain by hand and appreciating ICH performances.

4.2. Economic Value: Boosting Industries and Expanding Markets

The traditional ceramic industry mainly focuses on the production and sales of porcelain, with a short industrial chain and low added value. The integration of culture and tourism has injected strong momentum into the ceramic industry, which not only expands the market scale, but also promotes the extension and upgrading of the industrial chain of Jingdezhen ceramic ICH, forming an industrial ecosystem where multiple formats such as "creation, display, experience and sales" coexist. Taoxichuan and Sanbao Village have gathered a diverse group of creators including Chinese and foreign artists, "Jingpiao" makers and ICH inheritors, forming an open and inclusive creative atmosphere. Through the combination of digital exhibition and physical display, the

Imperial Kiln Museum and the Ceramic Museum have incubated 320 ICH-related projects offline, driving an investment of 1.8 billion yuan, built a comprehensive display system, and promoted the symbiotic development of multiple formats. This not only enhances the economic value of Jingdezhen ceramic ICH, but also strengthens the risk resistance and sustainable development capabilities of Jingdezhen's ceramic industry, providing solid economic support for the digital-intelligent inheritance of Jingdezhen ceramic ICH.

5. Digital Innovation and Digital-Intelligent Inheritance of Jingdezhen's Ceramic Intangible Cultural Heritage

5.1. Integration of Digital-Intelligent Communication in the Festival Scenario of "Taoran Market"

Under the trend of cultural-tourism integration, Taoran Market in Taoxichuan, as a landmark IP of the integration of Jingdezhen ceramic ICH and culture-tourism, has constructed an innovative model with "festival scenario" as the core carrier. Relying on the Taoxichuan industrial heritage block complex, it has created a market scene integrating retro and artistic elements, showing the unique innovative charm of Jingdezhen's cultural and tourism industry. Taoran Market has set up 158 ceramic ICH exhibition areas and 96 interactive workshops, covering the whole process of craftsmanship such as clay kneading and porcelain painting, creating an immersive ceramic cultural experience space for tourists and enabling them to deeply perceive the connotation of ceramic culture. In addition, Taoran Market has actively embraced the digital wave, carrying out real-time live broadcasts of the market grand occasion through short video platforms such as Douyin and WeChat Channels. The maximum number of viewers in a single live broadcast reached 120,000, and the cumulative online exposure reached 580 million, greatly enhancing brand awareness and influence.

In addition, Taoxichuan has developed an online "Metaverse Porcelain Market" based on the big data user behavior model, with an average daily active users exceeding 20,000 and the premium rate of virtual land auction reaching 300%. This innovative measure not only expands the communication boundary of ceramic ICH culture, but also breaks geographical restrictions, allowing more people to experience the unique charm of ceramic ICH across time and space, opening up a new path for the inheritance and development of ceramic ICH culture.

5.2. Technology and Digital-Intelligent Preservation in the Digital Exhibition of the Imperial Kiln Museum

The digital exhibition project of the Imperial Kiln Museum focuses on "technology empowerment" as the core, constructs an innovative model of "digital-intelligent technology + online communication", and conducts more diversified digital-intelligent exploration in the field of cultural display and communication.

In terms of technology, AR technology is used to restore the whole process of porcelain firing in the imperial kilns of the Ming and Qing dynasties. By scanning the exhibits with mobile phones, tourists can watch the dynamic scenes of

virtual craftsmen making porcelain such as clay refining and billet pulling, enhancing the sense of immersion. AI somatosensory interaction technology allows tourists to simulate the porcelain-making movements of imperial kiln craftsmen in the interactive area, personally experience processes such as billet pulling and painting, and improve their participation. Taking internet-famous cultural relics such as "Suicui Ya" (Broken Porcelain Duck) and "Wuyu Fo" (Speechless Buddha) as prototypes, the Imperial Kiln Museum has created 12 types of digital ceramic collections, attracting the attention of a large number of young groups and expanding the audience of cultural relic communication. In terms of communication, the Imperial Kiln Museum has cooperated with CCTV to launch the digital exhibition Meeting·Porcelain of the Qianlong Reign, with the online playback volume reaching 120 million times. Its official WeChat account provides functions such as online tour guide, cultural relic inquiry and digital experience, with an annual online visit volume of 7.6 million person-times, breaking the constraints of time and space and allowing more people to easily appreciate the charm of ceramic culture.

5.3. Connection Between Traditional Craftsmanship and Modern Life in Sanbao Village's Cultural and Creative Design

As a famous tourist resort in Jingdezhen, Sanbao Village consists of various distinctive format spaces such as Taoyuan Valley Sanbao Porcelain Source Scenic Area, Taoyuan Valley International Cultural and Creative Center and Sanbao International Ceramic Art Village. On the basis of adhering to the core of Jingdezhen's traditional ceramic ICH porcelain-making techniques, Sanbao Village has integrated modern aesthetic elements by using digital-intelligent technologies such as 3D digital modeling and AI matching, and developed a variety of cultural and creative products. Through online digital trading platforms, the products have covered a wide range of markets at home and abroad. Digital-intelligent tools have lowered the threshold for creation, attracted craftsmen to return, solved the problem of inheritor shortage to a certain extent, realized cultural inheritance, and provided a digital-intelligent model for the protection and utilization of ICH.

The digital-intelligent transformation has promoted the sustainable development of Sanbao Village's ceramic cultural and creative industry. By building online digital display and trading platforms and adopting digital-intelligent marketing methods such as live-streaming e-commerce and panoramic store exploration, the product influence has been greatly enhanced, covering 31 provinces, municipalities directly under the Central Government and autonomous regions in China as well as 17 overseas countries, continuously injecting new digital-intelligent vitality into the inheritance of ceramic ICH. Through digital-intelligent scenarios such as online 3D product preview, digital documentaries of ICH craftsmanship and interactive virtual experience of porcelain making, consumers' understanding and recognition of Jingdezhen ceramic ICH culture have been further deepened. [5-6]

5.4. Comparative Case Analysis

The digital-intelligent innovation paths of the above cases have their own focuses, forming different development models of new formats. Taoxichuan Taoran Market focuses on "festival event-driven" development, expands its influence through scene construction and digital communication, and

emphasizes "communication breadth". The digital exhibition of the Imperial Kiln Museum focuses on "technology-driven" development, realizes the reproduction of techniques and digital continuity through various digital-intelligent technologies, and emphasizes "inheritance depth". The cultural and creative design of Sanbao Village focuses on "design-driven" development, realizes market-oriented transformation through product innovation and scene integration, and emphasizes "degree of integration into daily life". The formation of different paths is closely related to the resource endowments of each case: Taoxichuan relies on its industrial heritage resources, which is suitable for building large-scale and popular festival scenarios; the Imperial Kiln Museum has abundant cultural relics and academic resources, which is suitable for carrying out digital archiving and in-depth experience activities; Sanbao Village relies on its rural ecological resources, which is suitable for developing lightweight and life-oriented cultural and creative products as well as research and study projects. Despite the different paths, all cases have achieved a win-win situation of cultural value and economic value.

However, with the continuous advancement of the times, these cases are also facing various challenges. Firstly, the excessive pursuit of market benefits may lead to the simplification of techniques and dilution of culture, making it difficult to balance commercialization and authenticity. Secondly, although digital-intelligent technologies can enhance the effect of communication and experience, they may also weaken the unique value of handcrafted techniques, leading to the dilemma of balancing technology and handcraftsmanship. Finally, with the growth of the number of tourists, it is necessary to avoid ICH becoming a mere "check-in item" for tourists, which is a problem that needs to be continuously addressed.

6. Conclusion

Through the research on Jingdezhen's ceramic ICH culture, this paper finds that cultural-tourism integration is an effective path to realize the innovation of ICH handicraft cultural industries. Cultural-tourism integration provides diversified display and experience scenarios for ICH, making traditional culture move from closed workshops to the public eye. Digital technology has broken the constraints of time and space, expanding the communication boundary and inheritance forms of ICH. The two have jointly promoted the transformation of ICH from "static protection" to "digital-intelligent inheritance". The practice in Jingdezhen shows that the digital inheritance of ICH handicraft cultural industries needs to build a diversified system with "cultural protection as the core, technology empowerment as the support, market demand as the guide and cultural-tourism integration as the carrier" to achieve a win-win situation of cultural value and economic value.

The digital inheritance of Jingdezhen's ceramic ICH culture needs to develop in a deeper level. It is necessary to encourage the younger generation to carry out innovation on the basis of inheriting the core culture, so that the millennium-old ceramic ICH can continuously radiate new vitality in the wave of cultural-tourism integration and digitalization.

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