

Research on Living Heritage Transmission Path of Cultural Heritage in the Digital Age

Honglin Zhao*

Cangzhou Jiaotong Collage, Cangzhou, Hebei, 061199, China

*Corresponding author: Honglin Zhao, 489292951@qq.com

Copyright: 2026 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY-NC 4.0), permitting distribution and reproduction in any medium, provided the original author and source are credited, and explicitly prohibiting its use for commercial purposes.

Abstract: With the rapid advancement of digital technologies, the living inheritance of cultural heritage faces unprecedented opportunities and challenges. Against the backdrop of the digital era, this study first analyzes the characteristics of the digital age and the current status of cultural heritage preservation. It then delves into the positive impacts of digital technologies on heritage transmission, such as overcoming temporal and spatial constraints and innovating exhibition methods, while addressing potential negative effects including information authenticity issues and technological dependency risks. Building on this foundation, the research further examines core challenges in contemporary heritage preservation, including digital resource copyright issues, professional talent shortages, and cultural content deficiencies. Finally, it explores effective pathways for digital-era cultural heritage preservation through three dimensions: technological innovation, model innovation, and talent development, aiming to provide theoretical references and practical guidance for sustainable heritage preservation and development.

Keywords: Digital Era; Cultural Heritage; Living Inheritance; Inheritance Pathways; Digital Technology

Published: Aug 28, 2026

DOI: <https://doi.org/10.62177/apemr.v3i7.1672>

1. The Contemporary Context of Living Heritage Transmission

1.1 Characteristics of the Digital Age

The digital era, characterized by rapid information dissemination and technological iteration, has profoundly transformed various societal domains. In this context, information transmission has transcended traditional spatiotemporal constraints, enabling real-time global sharing. Emerging technologies such as artificial intelligence, big data, and blockchain continue to innovate, offering unprecedented opportunities for cultural heritage preservation and transmission. However, these technological advancements also present challenges—including ensuring the authenticity and integrity of cultural heritage content in an information explosion environment, and addressing adaptation issues caused by rapid technological updates. Additionally, the digital age manifests through diversified cultural communication methods, where traditional linear dissemination models are gradually being replaced by nonlinear, interactive approaches. This shift creates new possibilities for dynamic cultural heritage transmission while simultaneously raising the bar for preservation strategies.

1.2 Current Status of Living Heritage Transmission

The dynamic transmission of cultural heritage currently faces multiple challenges, with the most prominent issues being limited inheritance methods and a shortage of qualified practitioners. Traditional inheritance models primarily rely on oral

transmission and master-apprentice systems, which increasingly demonstrate limitations in modern society as they struggle to adapt to rapidly evolving social demands and technological environments. Furthermore, accelerated modernization has led to declining interest in traditional culture among younger generations, resulting in a severe aging of the inheritor workforce and risks of broken transmission chains. Concurrently, external constraints such as funding shortages and inadequate policy support further exacerbate the challenges in preserving and passing down cultural heritage.

2. Impact of Digital Technology on Living Inheritance of Cultural Heritage

2.1 Positive Impact

2.1.1 Breaking Temporal and Spatial Constraints

The rapid advancement of digital technology has created unprecedented possibilities for cultural heritage dissemination, enabling it to transcend geographical and temporal constraints for global outreach. Through digital platforms, cultural heritage can be preserved, exhibited, and shared in digital formats, significantly expanding its audience reach. For instance, the widespread adoption of the internet has allowed intangible cultural heritage (ICH) to be showcased via online databases, virtual museums, and social media channels. This not only enhances cultural heritage visibility but also creates new opportunities for living inheritance. China's ICH digitization process has progressed through three historical stages: "database integration," "online deployment," and "physical presence," gradually developing digital characteristics that combine form, dissemination, and experiential engagement. This integrated online-offline digital landscape further accelerates cultural heritage transmission. Clearly, digital technology constructs virtual spaces that allow cultural heritage to transcend geographical boundaries, serving as vital bridges connecting people from diverse cultural backgrounds^[1].

2.1.2 Innovative Presentation Methods

The application of digital technologies such as virtual reality (VR) and augmented reality (AR) has revolutionized the presentation of cultural heritage, significantly enhancing audience engagement and immersive experiences. VR technology creates immersive environments that allow viewers to fully experience the historical context and artistic charm of cultural relics, while AR technology overlays digital information onto real-world scenes to provide richer interactive interactions. For instance, in the digital preservation and exhibition project of Dunhuang Mogao Grottoes, researchers successfully integrated VR and AR technologies with authenticity impression management theory, achieving dynamic dialogue between heritage conservation and experiential engagement. This approach offers innovative solutions for multi-space utilization of cultural assets. In the contemporary era, modern scientific advancements have enriched the conceptual depth and elevated the quality of historical heritage, further highlighting the pivotal role of digital technology in dynamic cultural preservation. Consequently, digital exhibition methods not only enhance the visual expressiveness of cultural heritage but also infuse it with renewed vitality.

2.2 Negative Impacts

2.2.1 Information Authenticity Issues

While digital technologies have significantly facilitated the dissemination and preservation of cultural heritage, their application may also raise concerns about information authenticity, potentially compromising the original integrity of cultural artifacts. The digitization process involves multiple stages including data collection, processing, and presentation, where technical limitations or human factors at any stage could lead to information distortion or misinterpretation. For instance, during digital documentation of cultural heritage, insufficient scanning precision or improper post-editing may result in loss or distortion of original data, thereby affecting authenticity and completeness. Furthermore, the widespread distribution of digital resources may exacerbate risks of misinformation, particularly when general audiences lack professional guidance to distinguish credible content from fabricated information. Such authenticity issues not only diminish the historical value of cultural heritage but may also cause misinterpretation of its cultural significance, ultimately jeopardizing the sustainability of its living heritage transmission^[2].

2.2.2 Risk of Technological Dependence

Excessive reliance on digital technologies may pose challenges to traditional craft preservation, potentially leading to neglect or marginalization of certain heritage practices. During cultural heritage digitization processes, technological solutions

are often prioritized as key solutions, while traditional oral transmission methods and manual craftsmanship risk being overlooked due to perceived inefficiency. For instance, domestic studies on heritage revitalization reveal that although productive conservation and traditional village revitalization have become recent research hotspots, the transmission of living cultural practices still faces significant challenges, with technological dependence being a major factor. Moreover, the rapid iteration of digital technologies makes it difficult for traditional craft inheritors to adapt to new requirements, further exacerbating preservation dilemmas. Therefore, while advancing digital protection and transmission of cultural heritage, it is crucial to remain vigilant against technological dependency risks and ensure balanced development between traditional techniques and modern technologies to achieve comprehensive living inheritance of cultural heritage^[3].

3. Challenges in the Living Inheritance of Cultural Heritage in the Digital Age

3.1 Copyright Issues of Digital Resources

In the digital era, the development and preservation of cultural heritage resources inevitably involve copyright issues, particularly regarding ownership attribution and usage authorization for digital cultural heritage assets. The development of digital cultural heritage resources typically requires integration of technological, content, and investment elements, a process often involving conflicting interests among multiple stakeholders that complicates copyright delineation. For instance, during the digitization of intangible cultural heritage, data collection, processing, and presentation may be conducted by different institutions or individuals, further complicating copyright ownership determination. Moreover, authorization mechanisms for digital cultural heritage resources remain underdeveloped, especially in cross-regional and cross-cultural communication contexts where balancing resource accessibility with copyright protection poses significant challenges. Concurrently, existing legal frameworks lag in addressing copyright issues related to digital cultural heritage resources, lacking targeted regulatory provisions that exacerbate dispute frequency and resolution difficulties^[4].

3.2 Shortage of Professional Talent

The digital transformation of living cultural heritage transmission has raised higher demands for professionals. However, there remains a severe shortage of interdisciplinary talents who possess both expertise in cultural heritage preservation and digital technology skills, which significantly hinders heritage conservation efforts. Digitalization of cultural heritage requires not only advanced technologies such as big data analytics and artificial intelligence applications, but also a profound understanding of the cultural significance and historical value embedded in heritage artifacts. This necessitates practitioners with cross-disciplinary knowledge backgrounds. Yet current higher education systems in China still demonstrate insufficient integration between cultural heritage studies and digital technology-related disciplines, resulting in graduates who fail to meet practical industry needs. Moreover, existing heritage practitioners generally lack systematic digital training, creating substantial challenges in utilizing digital tools for cultural heritage preservation and dissemination. These limitations ultimately constrain the effective application of digital technologies in dynamic cultural heritage transmission processes^[5].

3.3 Issue of Cultural Connotation Deficiency

In the digitalization process, excessive focus on formal innovation and technical presentation may lead to neglect of the profound cultural connotations underlying cultural heritage, thereby compromising its dynamic transmission effectiveness. Digital technologies provide diverse presentation formats for cultural heritage display and dissemination. Applications like virtual reality (VR) and augmented reality (AR) can significantly enhance audience engagement. However, if technological implementation is prioritized over cultural content exploration and transmission, cultural heritage risks becoming hollow visual symbols devoid of original spiritual value. For instance, in digital preservation of intangible cultural heritage, overemphasizing morphological restoration while ignoring historical contexts, social functions, and cultural significance may result in superficial inheritance practices that fail to achieve sustainable development. Therefore, finding a balance between technological innovation and cultural heritage preservation has become a critical challenge for dynamic cultural transmission in the digital era^[6].

4. Exploration of Living Heritage Transmission Pathways in the Digital Age

4.1 Pathways of Technological Innovation

4.1.1 Big Data Analysis

In the digital era, big data technology has provided innovative perspectives and tools for the dynamic preservation of cultural heritage. Through the collection, processing, and analysis of massive datasets, we can accurately identify public demands and interests regarding cultural heritage, thereby establishing scientific foundations for heritage preservation strategies. For instance, analyzing social media platforms ‘trending topics on cultural heritage, assessing emotional tendencies in user comments, and monitoring keyword search frequency can reveal distinct attention patterns and latent needs across different demographics. Moreover, big data technology enables integration of multi-source heterogeneous data—including historical archives of cultural heritage, visitor behavior patterns, and market research reports—to create comprehensive heritage resource databases. This data-driven approach not only optimizes exhibition content and communication methods but also enhances the precision and effectiveness of heritage conservation efforts. However, it’s crucial to note that big data applications in cultural heritage preservation must address challenges such as data quality assurance and privacy protection to ensure analytical results remain reliable and legally compliant^[7].

4.1.2 Artificial Intelligence Applications

As a core representative of digital technologies, artificial intelligence (AI) demonstrates remarkable potential in cultural heritage restoration, preservation, and intelligent guided tours. In cultural heritage restoration, AI technologies leverage image recognition and deep learning algorithms to digitally reconstruct and virtually repair damaged artifacts. For instance, algorithms based on Generative Adversarial Networks (GANs) can infer the original form of relics from existing fragments and generate high-precision restoration plans, providing references for actual restoration work. In cultural heritage conservation, AI technologies integrate sensor networks and real-time monitoring systems to dynamically track critical indicators such as environmental conditions and structural stability of artifacts, enabling timely detection of potential risks and implementation of protective measures. Additionally, in intelligent guided tours, AI-driven voice interaction systems and personalized recommendation engines deliver immersive cultural experiences. Through natural language processing technology, smart tour systems can automatically suggest cultural heritage exhibits or interpretive content tailored to visitors’ interests and preferences. These applications not only enhance the efficiency of cultural heritage preservation and transmission but also provide more convenient channels for public engagement in heritage-related activities^[8].

4.2 Pathways for Model Innovation

4.2.1 “Culture + Technology” Model

The “Culture + Technology” model serves as a crucial pathway for driving innovative development in cultural heritage preservation. Its core lies in deeply integrating culture with technology to achieve creative transformation and innovative advancement of cultural heritage. Within this framework, digital technologies are extensively applied across multiple dimensions including digital preservation, virtual exhibitions, and interactive experiences. For instance, through 3D modeling and virtual reality (VR) technologies, static cultural artifacts can be transformed into dynamic digital assets, allowing audiences to immerse themselves in virtual environments and experience the charm of heritage sites. Meanwhile, augmented reality (AR) technology further expands the presentation formats of cultural heritage, enabling it to integrate more vividly and intuitively into modern life. Additionally, this model emphasizes cross-disciplinary integration with culture, art, and design. By adopting the digital humanities concept of “Technology + Culture + Art + Design,” it fosters culturally distinctive products and services that reflect contemporary characteristics. This approach not only diversifies the dissemination methods of cultural heritage but also infuses it with renewed vitality, enhancing its resilience in the digital age^[9].

4.2.2 “Culture + Tourism” Model

The “Culture + Tourism” model serves as an effective approach to promote dynamic cultural heritage preservation through cultural-tourism integration. Its core lies in combining cultural heritage resources with the tourism industry to achieve dual value in both cultural and economic dimensions. Under this framework, cultural heritage not only acts as a key source of tourist attraction but also functions as a vital medium for cultural dissemination and inheritance. For instance, developing heritage-themed travel routes, cultural immersion experiences, and creative merchandise can engage more visitors in heritage conservation efforts. Moreover, digital technologies further enhance the model’s effectiveness. Smart navigation systems

and virtual reality technologies provide immersive cultural experiences during tours, while big data analytics enable tourism businesses to precisely target customer demographics and optimize heritage tourism product design and marketing strategies. This approach not only facilitates dynamic cultural heritage transmission but also injects new vitality into regional economies, creating a virtuous cycle of cultural, economic, and social development^[10].

4.3 Talent Development Pathway

4.3.1 Interdisciplinary Education

In the digital era, the dynamic preservation of cultural heritage requires a substantial pool of interdisciplinary professionals proficient in both heritage conservation and digital technologies. Cross-disciplinary education serves as a crucial pathway to cultivate such talents. As primary institutions for talent development, universities should actively explore interdisciplinary integration between cultural heritage studies and related fields like computer science and art design, offering specialized courses and practical projects. For instance, courses such as “Digital Conservation of Cultural Heritage” and “Digital Humanities Research Methods” enable students to systematically master fundamental theories and techniques of heritage preservation while acquiring digital technology skills. Furthermore, cross-disciplinary education should emphasize fostering innovative thinking and practical competencies through initiatives like heritage digitization competitions and hands-on project participation, allowing students to gain practical experience and enhance overall capabilities. This educational model not only addresses the current shortage of specialized professionals in cultural heritage sectors but also provides robust talent support for the sustainable transmission of cultural heritage^[11].

4.3.2 Practical Training

Beyond interdisciplinary education, practical training serves as a crucial measure to enhance the digital technology application capabilities of existing cultural heritage inheritors and practitioners. To address the widespread lack of digital literacy among heritage practitioners, relevant authorities should regularly organize digital technology workshops, inviting experts to explain fundamental principles and operational methods of cutting-edge technologies such as big data analysis and artificial intelligence applications. Simultaneously, case studies and hands-on exercises should be implemented to help inheritors master how to apply digital technologies in cultural heritage conservation, exhibition, and dissemination efforts. Additionally, establishing digital heritage practice bases can provide practical platforms for inheritors and professionals to hone skills and accumulate experience in real-world environments. This theory-practice integrated training model not only improves digital literacy among inheritors but also injects new vitality into the dynamic transmission of cultural heritage^[12].

Funding

No

Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

Reference

- [1] Lei, W., & Xie, X. (2023). From sealed preservation to dynamic revitalization: Digital and intelligent innovation of China's excellent traditional culture. *Publishing Broad Angle*, (19), 11-18.
- [2] Wang, Y., Xue, Y., Zhang, X., & Li, Y. (2024). Innovation in the protection and inheritance pathways of intangible cultural heritage in the digital age. *News World*, (3), 68.
- [3] Hua, J. (2023). Resource development in digital cultural industry: TCI framework, three dimensions and key enhancement areas. *Journal of Tongji University (Social Sciences Edition)*, 34(3), 46-59.
- [4] Wang, S., & Li, J. (2023). Experiencing authenticity and protecting authenticity: Sustainable inheritance and comprehensive utilization of cultural heritage in the context of cultural digitization. *Art Design Research*, (1), 5-11.
- [5] Wen, W., & Zhao, M. (2022). Digital scenarios and construction paths of China's intangible cultural heritage. *Theory Monthly*, (10), 89-99.
- [6] Zhou, J. (2022). Digital technology empowering the protection, inheritance and development of cultural heritage. *Journal of Fujian Agriculture and Forestry University (Philosophy and Social Sciences Edition)*, 25(3), 8-12.

- [7] Lin, B., Wei, F., & Zhao, J. (2021). Research progress and review on domestic heritage revitalization. *Hubei Agricultural Sciences*, 60(22), 11-18.
- [8] Huang, P., Liang, H., Yuan, B., & Huang, J. (2023). Research on the protection and dissemination of intangible cultural heritage in the new era. *Journal of Guangdong Socialist College*, (4), 107-112.
- [9] Cheng, Z. (2023). The cultural form of “New Cultural Creativity” and the contemporary shaping of China’s image. *Industrial Engineering Design*, 5(6), 7-12.
- [10] Wang, X., & Gao, L. (2023). Exploring pathways for revitalizing historical and cultural heritage in the new era. *Journal of Jinzhong University*, 40(6), 43-45.
- [11] Song, Q., Wang, P., & Zhang, B. (2022). Evaluation of regional cultural capital stock and its impact on economic growth: A case study of Shaanxi Province. *Research on Productivity*, (2), 43-49.
- [12] Li, S., Tu, M., & Jiang, S. (2022). A synchronic profile of theoretical research—A case study of visualized bibliometric analysis of China’s intangible cultural heritage academic literature in 2021. *China Intangible Cultural Heritage*, (6), 6-14.