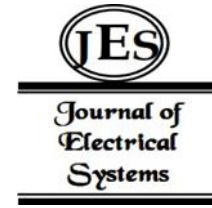


¹ Minli Shi
^{2,*} Xiaodong Zheng

Research on Innovative Dissemination Models of Nantong's Intangible Cultural Heritage under the Background of Big Data



Abstract: - Intangible cultural heritage is a product of human society's spiritual civilization and a precious wealth left by history, carrying the wisdom of mankind and the civilization and splendour of human history. Nowadays, in the era of the development of cultural diversity, with the rise of a new generation of technologies such as Big Data and Artificial Intelligence, the audience of cultural heritage breaks the limitations of time and space, while the means and paths for the protection and inheritance of cultural heritage are becoming richer and richer. By summarizing the connotations and characteristics of intangible heritage, sorting out the changes and developments in its transmission methods, analyzing the opportunities for the dissemination of intangible heritage in the digital age, examining the challenges faced by Nantong's intangible cultural heritage in its dissemination, and combining current hot topics, this study proposes new paths for the dissemination of intangible heritage in the digital era in Nantong. The aim is to achieve efficient and widespread transmission from multiple angles, providing new ideas for cultural construction and cultural identification.

Keywords: Intangible Heritage IP, Digital Heritage Transmission, Big Data, Immersive Interaction, Image Information Processing.

I. INTRODUCTION

In recent years, the state has placed great emphasis on the preservation and protection of intangible cultural heritage, establishing protection systems at the "national, provincial, municipal, and county" levels respectively [1]. Against the backdrop of digitalization, the advancement of digital technology offers a broader horizon for the dissemination of intangible cultural heritage. Various interactive software has fostered communication and dissemination, with intangible heritage being promoted on platforms like Weibo, QQ, WeChat, and Douyin. The city of Nantong boasts a wealth of intangible cultural heritage resources, diverse in nature and rich in regional characteristics and uniqueness, holding potential value for inheritance and development. In this digital era, the rise of intangible heritage IP has become a trend. Questions arise on how to allow intangible heritage to innovate in its transmission amidst contemporary societal progress, how to explore new avenues for its dissemination, and how to harness it to cultivate the local cultural industry. With the arrival of the information age, big data is gradually active in various fields, therefore, in order to hope to realize the inheritance and development of intangible cultural heritage in Nantong, it is necessary to keep abreast of the times, relying on big data, with the help of image information processing technology and equipment, to improve the resource base, to establish the industry exchange platform and the industrial economic platform, to explore the communication mode in various fields, and ultimately to promote and carry forward the intangible cultural heritage in Nantong.

II. THE ESSENCE AND FEATURES OF INTANGIBLE CULTURAL HERITAGE

A. The Significance and Contemporary Value of Intangible Cultural Heritage

Intangible Cultural Heritage, often abbreviated as "intangible heritage", represents forms of exquisite traditional culture developed throughout human civilization. It embodies the historical and cultural essence of nations and countries, originates from the productive life of the working masses, and stands as a spiritual legacy passed through generations [2]. Surveying the progression of human society, from early painting and sculpting techniques, to hands-on artistic teachings, to the civilized festivities and celebrations, they all encapsulate the humanistic spirit, artistic treasures, and cultural depth of human society. As such, the transmission of intangible heritage shouldn't merely revolve around replication. It should innovate upon the foundation of cultural understanding. With the rapid progression of information technology, only by tapping into the essence of intangible heritage and aligning with contemporary trends can we seek innovation in inheritance and sustain growth through effective dissemination [3].

¹ Nantong Institute of Technology, Nantong, Jiangsu 226002, China

² Nantong Institute of Technology, Nantong, Jiangsu 226002, China; Macau University of Science and Technology, Macau 999078, China

*Corresponding author: Xiaodong Zheng

Copyright © JES 2024 on-line : journal.esrgroups.org

Intangible cultural heritage, as a precious cultural resource, not only encapsulates historical and cultural significance but also provides a rich historical foundation for researching regional economics and politics. In recent years, the state has emphasized profound research into the historical culture, developmental trajectory, and future trends of intangible heritage. Telling Chinese tales is an effective approach to the “lively” promotion of intangible heritage, instrumental in constructing symbols of culture with Chinese characteristics, thereby forming cultural memories and forging cultural confidence and identity [4]. Cultural depth represents the spiritual essence of a nation, reflecting certain artistic and social values. Artistic value is what audiences perceive most directly, as they appreciate intangible heritage and discern the aesthetic trends and principles of ancient culture and art. Social value, on the other hand, signifies the embodiment of national unity. Most intangible cultural heritages arise in a conducive social environment, and their promotion reinforces the ideals of socialist harmony. Furthermore, intangible heritage possesses economic significance. By converting esteemed traditional cultural resources into productive assets, and establishing intangible heritage IP, it not only achieves its promotion but also boosts local economic growth, propels the advancement of Chinese culture, further stimulates economic progress, and achieves favorable economic returns [5,6].

B. The Significance and Contemporary Value of Intangible Cultural Heritage

First, confirm that you have the correct template for your paper size. This template has been tailored for output on the US-letter paper size. If you are using A4-sized paper, please close this template and download the file for A4 paper format called “CPS_A4_format”. Nantong, known as China’s first modern city, possesses a rich historical background and an array of traditional crafts, including blue calico, bانياo kites, rosewood carving, tie-dyeing, paper-cutting, and more [7]. The intangible cultural heritage projects in Nantong are diverse. To date, there are 10 national-level projects such as blue calico, Haimen mountain songs, and Tongzi opera. The national level NRM program is shown in Figure 1 53 provincial-level projects including Hai’an flower drums, Baipu tea processing techniques, Tongzhou folk songs, and 106 municipal-level projects like paper-cutting, lantern decorations, kesi weaving, and woodblock New Year paintings. To facilitate management and promotion, an official website for Nantong’s intangible cultural heritage has been established, offering introductions to the heritage list, heritage classrooms, inheritors, and exhibition halls. Both the government and inheritors place significant emphasis on promoting intangible heritage, achieving its dissemination through hosting heritage markets, exhibitions, museums, hands-on activities, and bringing inheritors into classrooms. The NRM bazaar is shown in Figure 2.



Figure 1: The National Level NRM Program



Figure 2: Non-heritage Bazaar

The intangible cultural heritage of Nantong is highly regional and unique. For instance, the initial batch of blue calico and baniao kites each has a distinct crafting process. The production of blue calico involves techniques like tie-dyeing, batik, and stamping. Different methods yield various effects, reflecting the lives of the people and showcasing their wisdom and aesthetic appreciation [8]. Baniao kites, with their exquisite craftsmanship and unique sound, incorporate geometric designs and integrate with folk customs, making them a regional specialty [9]. Moreover, performances such as Haimen mountain songs and Hai'an flower drums illustrate the connection between intangible heritage and everyday life, manifesting the Nantong residents' love for life.

Currently, the promotion of Nantong's intangible cultural heritage faces several challenges as follows: Lack of engaging introductions: Presently, the descriptions on the official website are text-based, making the dissemination bland and discouraging audience interest, leading to ineffective dissemination. Singular mode of dissemination: Information is only available on the official website and WeChat public platforms, missing the opportunity to connect more deeply with the public. Absence of brand influence: The development of intangible heritage IP lags, failing to capture nationwide or international attention. Low integration with tourism resources: In the context of blending culture and tourism, leveraging tourism to promote culture and utilizing distinct culture to boost the tourism industry is an inevitable trend. However, Nantong's intangible heritage remains relatively isolated. Short-term participation in ancient towns hosting heritage markets doesn't sufficiently stimulate industry growth or cultural promotion.

III. EVOLUTION AND TRANSFORMATION OF INTANGIBLE HERITAGE DISSEMINATION METHODS

The transmission of intangible heritage is deeply intertwined with people's production and daily lives, closely related to the original natural and social environments. The advancement of the times has facilitated the diversified development of dissemination media. The way intangible heritage is conveyed has evolved from traditional oral transmission to the current trend of digital dissemination.

A. Oral Transmission of Information

Traditional paper-based dissemination and word-of-mouth were the earliest methods of intangible heritage transmission. Some aspects of intangible heritage rely on oral tradition, for example, the preservation of folk songs requires passing them down orally, immersing oneself to truly grasp the essence of the heritage for effective transmission. Articles are also a means of information exchange, conveying knowledge about intangible heritage through language and text. This oral transfer of information is a product of its time, suitable for transmitting linguistic intangible heritage and more fitting for an older audience.

B. Visual Emergence through Integration of Text and Images

Using paper-based media such as newspapers and books, intangible heritage-related information is visually presented to the audience, enhancing its readability and visualization. Even today, paper media remains one of the most frequently used channels for transmitting intangible heritage. The combination of text and images enhances visual expression. For instance, the intangible heritage promotional posters seen at major airports, high-speed rail

stations, subway stations, etc., creatively attract the attention of the audience, leaving a profound impression, thereby achieving the purpose of intangible heritage dissemination. The NRM poster is shown in Figure 3.



Figure 3: Poster for the Promotion of Non-heritages

C. Audiovisual Presentation through Dynamic Imagery

Thanks to technological advancements, the emergence of broadcast media like radio and television has opened new avenues for intangible heritage dissemination, with the fusion of visual and auditory effects greatly enhancing the engagement factor. The rise of the internet has also expanded dissemination modes [10]. Furthermore, advancements in information technology allow the audience to instantly experience the allure of intangible heritage. For example, through various social media platforms like Weibo, WeChat, and Douyin (TikTok), one can promote and learn about intangible heritage, answer related questions, and more. Short videos and live streaming, in particular, have infused fresh vitality into intangible heritage dissemination. Accounts like “Sichuan Intangible Heritage” and “Zhejiang Intangible Heritage” are widely followed on these platforms, enriching the audiovisual experience and drawing a vast audience.

D. Full Sensory Stimulation through Virtual Interaction

The growth of virtual reality (VR) and augmented reality (AR) technologies are pushing intangible heritage dissemination towards an era of intelligent media dissemination, aligning with the inevitable trend of digital dissemination. Intangible heritage information is presented to audiences through visualization technologies. In today’s rapidly evolving information exchange landscape, achieving effective dissemination necessitates enhancing visualization [11]. AR and VR technologies, characterized by their immersive and interactive features, elevate the interactive experience and emotional engagement of intangible heritage dissemination, drawing the audience to actively participate. Common examples include museums and art galleries utilizing holographic projection technology to enhance visual experiences, or simple cultural interactive experiences to understand regional intangible cultural heritage, achieving transnational and interregional transmission effects. The holographic projection is shown in Figure 4.



Figure 4: The Holographic Projection

IV. OPPORTUNITIES FOR INTANGIBLE CULTURAL HERITAGE DISSEMINATION IN THE DIGITAL AGE

A. *Support of Technological Means*

In the digital era, with the accumulation of hardware and software technologies, various technological barriers are continuously broken down. Various digital technologies are extensively applied in different fields, paving new avenues for the protection and dissemination of intangible cultural heritage (ICH). These technologies also offer diversified spaces for its evolution. Current breakthroughs and developments in various technologies have given a new momentum to the protection and dissemination of ICH. Technologies being utilized for this purpose include: information databases, digital imaging technology, 3D technology, virtual reality, augmented reality, and more. Each technology displays distinct features and advantages and is extensively employed in various ICH protection tasks [12].

Digital imagery is created using digital technology methods, such as digital images, digital illustrations, digital animations, digital short films, etc. Digital imaging technology integrates the collection, processing, synthesis, and output of images, uniquely advantageous for artistically recording and presenting the original state of intangible cultural heritage [13]. 3D technology uses computer software to recreate real materials in virtual three-dimensional models. It can also dynamically simulate the creation and evolution of real materials, displaying the shape, material, and other characteristics of objects from all angles. Virtual Reality (VR) technology offers immersive experiences through wearable devices. Users can immerse themselves in a computer-generated virtual environment and interact in real-time using speech, gestures, and other natural methods, enhancing the feeling of realism and immersion. Augmented Reality technology overlays virtual information on the real world through digital displays and offers real-time interaction. By merging the virtual and real, it emphasizes enhancing users' understanding and perception of real-world information and objects, effectively boosting the sensory experience.

B. *Expansion of Presentation Methods*

The extensive use of various technologies and platforms gives the digital representation of intangible heritage two distinct characteristics: first, diverse presentation methods; second, innovative content. Different technologies and platforms coexist as carriers and mediums for intangible heritage dissemination within the same space and time. With the support of the internet and the application of comprehensive technologies, intangible heritage content has been reorganized, arranged, and integrated. It has shifted from traditional visual forms to audio-visual representations and sensory engagement, moving away from the passive mode people used to receive such information. This new approach aligns more with public wishes and aids the representation of intangible heritage content. Changes in technology and platforms have spurred content innovation. In the digital and entertainment era, only content and forms that are rich, of high quality, and creative can captivate the public's attention. Digital mediums have changed the portrayal and interpretation paths of intangible cultural heritage, significantly expanding its display content. For example, digital animations give intangible heritage new vitality with exaggerated and humorous forms, combining animation elements with cultural heritage, resulting in new content in stories and characters. Virtual reality creates culture in digital forms and produces digital creative products, leading to more resonances and transitions between the virtual and the real, online and offline [14].

C. *Expansion of Audience Scope*

The use of digital technology and the internet has brought revolutionary breakthroughs for intangible heritage dissemination. In this environment, people can access intangible heritage content anytime, anywhere, using various internet platforms [15]. Digital media establishes an egalitarian, liberal, and diverse platform, providing a convenient, affordable, and accessible technological foundation for the diverse transmission of cultural heritage. Platforms, with the backing of technology, have built a regular mechanism for culture dissemination based on their interactivity, convenience, expandability, and portability. They guide the public in regular learning and disseminating exceptional traditional culture, indirectly tapping into potential audiences interested in various intangible heritages, expanding the inheriting crowd of intangible cultural heritage. As a result, a new form of inheritor has emerged: the digital inheritor. This new form possesses digital technology skills and uses them to digitize, organize, integrate, represent, share, and spread the intangible cultural heritage they're interested in. Through this process, intangible heritage shifts from being exclusive, unique, and regional to being shareable, reproducible, and widespread. Digital inheritors can communicate and interact positively with local inheritors.

V. NEW PATHWAYS FOR DISSEMINATING INTANGIBLE CULTURAL HERITAGE IN THE DIGITAL AGE

A. Establishment of Intangible Cultural Heritage Databases

Intangible Cultural Heritage (ICH) databases currently serve as the main form and core work of ICH digitization, as well as the foundational task for ICH preservation and dissemination [16]. The creation of ICH databases can encompass text materials, visual materials, etc. After classification and organization, they establish educational resources, interview videos, display frameworks, etc. The openness and sharing of these databases propel ICH dissemination towards internationalization, subsequently enhancing national cultural influence. For Nantong, it's essential to integrate and enrich the existing database content, incorporate ICH explanation videos, share insights from ICH inheritors, and showcase innovative creative works. At the same time, strengthening connections with national ICH dissemination is vital, as is simplifying browsing steps and enhancing the richness and visual effects of ICH content.

B. Construction of Digital Museums

Digital museums represent a new model for ICH preservation and dissemination. Compared to traditional museums, digital museums transcend the limitations of time and space, displaying historical cultures and ICH stories anytime and anywhere with diverse visual effects [17]. For instance, the Nanjing Museum's digital branch combines both physical and virtual exhibitions to showcase the historical culture of Jiangsu. Nanjing Museum Digital Pavilion as shown in Figure 5. The physical exhibition employs multimedia forms like transparent screens and QR codes, leveraging real-time image extraction and motion capture techniques to create a digital display space. The virtual exhibition uses interactive and image recognition technologies to immerse audiences in historical and cultural contexts, and visitor creations might even be showcased in the physical exhibition, greatly enhancing engagement and experience. Nantong has considerable potential in digital museum construction. If ICH dissemination can utilize digital museums, it can promote ICH in a novel and engaging manner while simultaneously promoting local culture and branding. For instance, designing an interactive experience for the creation of Nantong's traditional kites, which includes framework assembly, whistle size and shape selection, pattern drawing, flying effects, etc., combined with a virtual environment display, results in an integrated audio-visual digital exhibit.



Figure 5: Nanjing Museum Digital Pavilion

C. Utilizing New Media Platforms

The advancement of new technologies promotes digitization, and the animation and gaming industries are flourishing. These sectors, through ICH project development, model creation, and scenario design, facilitate ICH dissemination. As media platforms, animations and games play a significant role in shaping the development of young people. Their entertainment features give them unique advantages in ICH dissemination, where the construction of virtual environments, the integration of historical culture, and the infusion of ICH knowledge provide profound educational value [18]. Nantong, being the first modern city in China, should fully harness its unique characteristics to explore the dynamic inheritance of ICH, integrating local culture while disseminating ICH, and creating unique urban and ICH brands that deeply resonate with the public.

Additionally, the rapid growth of social media offers opportunities for ICH dissemination. ICH promotion, relying on the influential power of social media platforms, transforms products into cross-boundary derivatives, paving new ways for ICH dissemination. Delving deeply into the essence of ICH culture and understanding the “craftsmanship spirit” of ICH inheritors, the design process of ICH IP should emphasize the stories of inheritors or artists, visually representing the core spirit of ICH, achieving a dynamic inheritance of ICH [19]. For instance, incorporating industrial scenarios into games, designing production and living activities like textile and education industries into games, and integrating ICH activities such as blue-printed fabric, traditional kites, paper-cutting from Hai’an, and rosewood carving into game works allow audiences to effortlessly acquire ICH knowledge while being entertained. Platforms like TikTok, Weibo, and WeChat can be used to build ICH brands, introducing Nantong’s ICH culture and the daily lives of ICH inheritors, or setting up ICH lecture halls. By collaborating with brands, topics, and traffic can be revitalized, achieving a synergy between ICH dissemination and the cultural and creative industries, maximizing the latent industrial benefits behind cultural industries [20,21].

D. Utilizing New Technological Means

Holographic projection, AR (Augmented Reality) technology, and VR (Virtual Reality) technology are capable of “breaking the bounds of time and space, creating a magical scene where the virtual blends with the reality, conveying stories in a more lively and interesting manner to the audience,” thus providing a completely immersive experience [22]. Virtual reality technology creates a powerful “hyper-reality” space, and under the path of complex linking technology, the means of expressing ideas in art texts is gradually changing from flat images to multimedia images, media images and other media forms, and reflects the distinctive characteristics of postmodern culture, such as immersion, collage, disorder and so on [23]. By applying these new technological methods, the traditional intangible cultural heritage can be digitally presented, and interactive games can be used to participate in the crafting processes, achieving effective and efficient dissemination. For instance, by “crossing boundaries” to combine modern advanced techniques with traditional craftsmanship, and integrating their applications, we can digitally showcase them. This not only resonates with the entertainment preferences of today’s youth but also injects new vitality into intangible heritage.

VI. CONCLUSION

Intangible cultural heritage is a product of human spiritual civilization. In today’s fast-paced development of information technology, only by exploring the essence of intangible heritage, integrating technological innovation, and keeping pace with the trend of the times, can it leave a mark in the wave of the era. Throughout historical evolution, human society has continuously explored effective means for the “dynamic” dissemination of intangible heritage, aiming to build cultural symbols with Chinese characteristics and form cultural memories. The progression of time has prompted the transition of intangible heritage dissemination from traditional oral transmission to today’s digital dissemination trend. The digitalization process of intangible heritage is not merely a simple utilization of technology. It also includes the valuation of cultural heritage resources, protection, interdisciplinary research, and collaboration. By pioneering new channels for intangible heritage dissemination, such as establishing databases, creating digital museums, leveraging new industries, social media, and innovative technologies, we can achieve efficient dissemination of intangible heritage, cultivating cultural confidence and cultural identity.

ACKNOWLEDGMENT

This work was supported by the Nantong Institute of Technology’s Second Batch of Middle-aged and Young Key Teacher Training Projects (Project Number: ZQNGGJS202246;

2021 Jiangsu Province University Philosophy and Social Science Research Project: City Brand Image Design and Promotion Research Based on Regional Cultural Characteristics (Project Number: 2021SJA1638);

2021 Nantong City Social Science Hotspot Topic (Special Research on Intangible Heritage): Research on the Innovative Dissemination Model of Nantong’s Intangible Cultural Heritage in the Digital Age (Project Number: FY21-032).

REFERENCES

- [1] Liang Shengrong, Fang Shurong, Research on the Development Mode of Intangible Cultural Heritage Tourism in Nantong City, *Technological Horizon*, 2012(29).
- [2] Zhang Zhaolin, Intangible Heritage Theme IP: The Symbiotic Relationship between Heritage, Revitalization, and the Current Young Audience, *Art Research*, 2020(06).

- [3] PENG Dongmei, PAN Lusheng, SUN Shouqian. Digital Conservation - A New Means of Safeguarding Intangible Cultural Heritage. *Art Research*, 2006(01):47-51.
- [4] Ma Xiaoting, Non-legacy “living” inheritance nourishes city and culture. *Qingdao Daily*, 2023-07-31(009).
- [5] Gao Xing, Research on the Living Inheritance of Local Intangible Cultural Resources under IP Perspective--Taking Nantong Blue Printed Fabric as an Example. *Textile Industry and Technology*, 2022,51(04):111-113.
- [6] Xu Tonglei,Xu Long, Intangible Cultural Heritage Resources Development and Protection Based on IP Perspective. *Heritage and Conservation Research*, 2019,4(02):41-43.
- [7] Zhou Ying, Research on Artistic Characteristics and Inheritance System of Nantong Intangible Cultural Heritage under the Background of Culture and Tourism Integration. *Art Appreciation*, 2020(14):66-67.
- [8] HUANG Botao, WEI Yuli, Design of non-heritage cultural and creative products based on Morris semiotics--Taking Nantong blue print fabric as an example. *Design*, 2023,36(04):38-42.
- [9] GUO Lili, WEN Chao, Research on the interaction design strategy of the digital platform of board harrier kites under the vision of non-heritage. *Design*, 2019,32(12):140-142.
- [10] Tian Yuhai, Research on the method and law of storytelling creation in the communication of non-legacy. *Western Radio and Television*, 2021,42(16):86-88.
- [11] WAN Pengyuan, Analysis of Digital Protection and Development of Intangible Cultural Heritage in China. *Tiangong*, 2020(06):26-27.
- [12] WANG Jianhua, LI Shuidong, Current status of research on digital protection of domestic intangible cultural heritage. *Hunan Packaging*, 2021,36(05):1-6+37.
- [13] Zhou Guanglei, Digital conservation - a new way forward for intangible cultural heritage conservation. *Comparative Research on Cultural Innovation*, 2018,2(20):146-147.
- [14] Xia Pu, Protection and Inheritance of Intangible Cultural Heritage under “Intangible Heritage +” Anime. *New American Domain*, 2022(03):79-81.
- [15] Li Guohong, Reflections on the Modernization of Communication of “Non-legacy”. *Journal of Chinese Culture*, 2021(06):102-103.
- [16] Liu Yao, Protection of Intangible Cultural Heritage and Inheritance of Traditional Chinese Culture, Harbin Institute of Technology, 2010.
- [17] Shen Rolan,Cheng Xiaoman,Gao Han, Design of digital museum for intangible cultural heritage. *Collection and Investment*, 2023, 14(07):143-145.
- [18] Qiu Ye, Research on the external communication path of non-heritage IP with digital game as the carrier. *New Media Research*, 2022, 8(23):89-92+96.
- [19] Zhou Ya, Xu Xin, A Review of Digitalization Research on Intangible Cultural Heritage. *Library and Information Work*, 2017(02).
- [20] Mei Na, Chen Xiaojuan, Research on the mode of non-legacy dissemination by “Shake” short video. *News Outpost*, 2019(05):28-29.
- [21] Lu Ruihong. Non-legacy living heritage empowers better cultural life. *China Social Science Journal*, 2022-06-22(006).
- [22] Zhang Zhaolin, Intangible Heritage Theme IP: The Symbiotic Relationship between Heritage, Revitalization, and the Current Young Audience. *Art Research*, 2020(06).
- [23] MA Jin, ZHANG Tongtong, QIAN Xiaosong et al. Current status of research on the application of artificial intelligence in the protection and inheritance of intangible cultural heritage. *Packaging Engineering*, 2023, 44(08): 1-14+36.DOI:10.19554/j.cnki.1001-3563.2023.08.001.