Research on the Construction of Digital Protection and Innovation System of Non-heritage Skills under the Perspective of Cultural Inheritance

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Abstract: Intangible cultural heritage bears the historical memories and cultural genes of a nation, and its inheritance faces the dual challenges of globalization impact and inter-generational break. The intervention of digital technology provides a brand-new path for the living inheritance of intangible cultural heritage skills, but current practices mostly focus on the superficial application of technology, lacking in the in-depth deconstruction and innovative transformation of the cultural essence. This research starts from the perspective of cultural inheritance, analyzes the dialectical relationship between technological tools and the cultural core in digital protection, and puts forward a theoretical framework for constructing a "protection-innovation" collaborative system, emphasizing that digital media should serve as a bridge connecting traditional skills with modern aesthetics rather than simply replacing manual practices. Through systematic strategy design, it explores the value regeneration mechanism of intangible cultural heritage skills in the digital age, providing methodological support for the sustainable survival of cultural heritage.

***Keywords*:** cultural inheritance; non-heritage skills; digital protection; innovation system construction

1. Introduction

The combined effects of industrial civilization and the wave of information are accelerating the erosion of the living space of traditional culture, and a large number of intangible cultural heritage skills are caught in a dilemma of either being "museumized" or commercially alienated. Although digital technology offers the possibility of high-precision storage and cross-time-space dissemination for cultural protection, existing digital projects have ignored the ecological characteristics of intangible cultural heritage as a living culture, which requires digital practices to go beyond the primary stage of archival preservation. This research attempts to break through the instrumental level of technological application, reveal the adaptive evolution laws of traditional skills during the process of technological empowerment, and provide a theoretical basis for constructing an inheritance system that combines cultural authenticity with contemporary innovation.

2. The Value of Non-Heritage Skills in Cultural Inheritance

As the materialized manifestation of living culture, the value of intangible cultural heritage skills is rooted in the complete preservation and adaptive transformation of the traditional knowledge system. The closed-loop chain formed by traditional craftsmanship from raw material collection to production processes actually constructs a symbolic system through which people in a specific region perceive nature and express aesthetics. This progressive relationship from objects to principles makes the skills themselves a key medium for decoding cultural codes. When industrial production severs the emotional connection between people and objects, the concept of meticulous craftsmanship and the warmth of artifacts contained in intangible cultural heritage skills precisely constitute a spiritual barrier against cultural alienation. Under the impact of the globalization wave, dialogue between different civilizational systems often needs to rely on concrete cultural carriers. Those craftsmanship paradigms tempered by history, due to their unique aesthetic genes, naturally have the discourse penetration power for cross-cultural communication. The contemporary society's rediscovery of intangible cultural heritage skills is essentially a conscious response to the cultural homogenization crisis in the era of mechanical reproduction.

3. Problems of Digital Protection of Non-Heritage Skills

The digital protection of intangible cultural heritage skills faces a deep-seated contradiction between data collection and value deconstruction. Although high-precision scanning equipment can record the forms of artifacts, it is difficult to capture the subtle changes in the craftsmen's wrist strength and the intuitive experience in material processing. Technology developers often simplify cultural values into quantifiable visual symbols. Although the details of artifacts reproduced by 3D modeling are very close to the real ones, the emotional projection in the handmade process and the connection with the regional ecosystem are stripped away. There are structural defects in the construction of standardized databases. The meta-

data standards used in different projects are incompatible with each other, resulting in semantic gaps during cross-platform data sharing. The digital achievements of some endangered skills are even at risk of secondary extinction due to outdated formats [1].

4. Construction Strategy of Digital Protection and Innovation System of Non-Heritage Skills from the Perspective of Cultural Inheritance

4.1 Construction of digital protection system

Constructing a digital protection system for intangible cultural heritage skills requires breaking through the simple data archiving mindset. At the collection stage, the protection entities should establish a coupling mechanism between dynamic monitoring equipment and the craftsmen's physical experience, track the changes in the holding angle of tools through pressure sensors, and simultaneously record the influence of temperature and humidity in the operating environment on the material properties. Interdisciplinary research teams need to formulate a metadata standard framework that takes into account both technological logic and cultural context, enabling the mechanical parameters of embroidery stitches and the symbolic meanings of patterns to form interoperable associated fields and solving the problem of semantic islands between different databases. Based on the virtual restoration engine, it can deduce the possibilities of traditional material ratios, and the digital twin model provides a pre-rehearsal sandbox for process improvement for inheritors, rather than replacing manual creation unilaterally.

4.2 Construction of Digital Innovation System

The digital innovation of intangible cultural heritage skills requires the construction of a symbiotic mechanism between technological R & D and cultural logic. Technological innovation teams are exploring the intelligent extension of traditional patterns by generative adversarial networks. The algorithm model generates new patterns that conform to aesthetic paradigms by analyzing the creative laws of craftsmen through the ages, which not only preserves cultural genes but also stimulates creative vitality. Educational institutions rely on virtual reality technology to build immersive training workshops. Apprentices can repeatedly adjust the proportion parameters of celadon glaze in the simulated environment, and the real-time visual feedback system transforms the bubble cracking in failed firing into a quantifiable learning path. Market operators try to integrate intangible cultural heritage elements into digital twin scenarios. After three-dimensional topological transformation, embroidery patterns are adapted to metaverse space installations [2].

4.3 Construction of Protection Mechanism

The construction of a digital protection mechanism for intangible cultural heritage skills urgently needs to build a multi-party collaborative governance framework. Legislative bodies should include the knowledge rights and interests of craftsmen in the protection scope of digital copyright law, and establish special rights-confirmation clauses for implicit knowledge passed down orally, so as to avoid the loss of cultural genes caused by mechanically applying the industrial intellectual property framework. The technology ethics committee needs to formulate a negative list for digital collection, set data-collection no-go zones for skills related to ethnic taboos such as the production of sacrificial utensils, and at the same time establish a technology risk assessment mechanism involving the participation of inheritance communities. Industry associations can take the lead in building a dynamic monitoring platform to track in real-time the application scenarios and adaptation degrees of digital resources [3].

5. Conclusion

The digitization of intangible cultural heritage skills should not become a cultural specimen in a technological frenzy but rather serve as a converter to activate the contemporary value of traditional wisdom. The construction of a digital protection system needs to be based on in-depth decoding of cultural genes, extracting the cognitive models and aesthetic codes behind the skills through technical means such as semantic modeling. The innovation system needs to cultivate a cultural production community in the digital age and reconstruct the inheritance ecosystem of traditional skills in the virtual space. The coordinated operation of this dual-system can not only resist the risk of fragmentation of cultural memory but also create cultural products that meet modern aesthetics.

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