

Analysis on the Path of Integrating Digital Intangible Cultural Heritage into Digital Creative Industry Empowered by Interactive Design

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Abstract

In the current context of digital transformation, the digital inheritance of intangible cultural heritage has become an unstoppable trend. As the most crucial driving force, interaction design not only enhances the user experience but also promotes the integration of digital intangible cultural heritage and the digital creative industry. This article analyzes the challenges and opportunities existing in the current integration process, explores the role of interaction design in heritage display, dissemination, and product innovation, and proposes feasible development paths from multiple dimensions. This research aims to promote the dynamic inheritance of intangible cultural heritage, deepen the cultural connotation of digital cultural products, and provide references for the healthy development of cultural heritage and the digital creative industry.

Keywords

Interactive Design; Intangible Cultural Heritage; Digitalization; Digital Creative Industry; Integration Path.

1. Introduction

In the rapidly developing digital era, digital transformation has deeply permeated the inheritance and innovation of cultural heritage (ICH). Currently, the traditional inheritance methods are difficult to meet the modern communication demands. Therefore, the digitization of ICH has become an important way to achieve inheritance and value promotion. At the same time, the digital creative industry requires deeper cultural content to enhance its core competitiveness.

With user experience at the core, interactive design provides new ideas and technical support for the integration of digital ICH and the digital creative industry. It can enhance the display, dissemination and experience effects of ICH, and promote the innovative development of cultural resources. However, in practical applications, there are still problems such as insufficient integration, single experience forms and low industrialization level.

Based on the above background, this paper takes interactive design as the enabling means to explore the path of integrating digital ICH into the digital creative industry. This research aims to break through the bottleneck of digital inheritance of ICH, enrich the development of the digital creative industry, and provide theoretical and practical references for the coordinated development of the cultural industry and the digital industry.

2. The Empowerment Mechanism of Interactive Design for Digital Intangible Cultural Heritage

Raw cultural heritage materials rarely work for direct commercial use in digital creative industries. Most exist in scattered, fragmented forms. They do not match the standard production workflows and creative logic common in today's digital cultural projects. These

materials need targeted sorting and creative reworking first, so they can become experience-focused cultural products that fit mainstream consumer expectations. Interactive design is key to this shift. It provides the practical technical support needed to turn raw heritage resources into market-ready creative content.

For years, digital heritage preservation has mostly stuck to basic sorting and static file archiving. It centers on recording cultural resources in digital or text form. It barely accounts for real user viewing experiences, or the practical market value these resources can create in creative scenarios. Interactive design shifts this narrow preservation approach. It reworks how heritage content is presented and spread, opens up space for secondary creation, and puts in place a practical system for closer integration between ICH and digital creative industries.

There is rich experiential value in digital intangible cultural heritage, and traditional static displays cannot fully deliver it. Immersive scene restoration, multi-sensory interaction and hands-on participation design turn abstract cultural meanings and complex craft details into easy, accessible experiences for regular audiences. Traditional one-way display modes usually fail to keep audiences engaged, and weaken people's sense of immersion. Interactive design addresses this shortcoming of flat heritage presentation. It helps audiences build a deeper bond with traditional culture, and boosts the market acceptance of heritage creative products [1].

Better user engagement is only one part of what interactive design brings. It also creates new space for heritage resources to develop creatively. Designers refer to mainstream public aesthetics and the practical demands of different creative scenarios, and pull core cultural elements from traditional decorative patterns, distinct craft features and local folk stories. These refined cultural symbols work as high-quality creative materials. They help developers diversify digital creative product types, and make the final works better fit the aesthetic and consumption habits of modern cultural audiences [2].

3. Core Paths of Digital ICH Integrating into Digital Creative Industry via Interactive Design

During the implementation process of integrating digital intangible cultural heritage into the digital creative industry ecosystem, interaction design serves as a crucial supporting means. Current industry practices show that the deep integration of the two is not carried out along a single path, but rather works together in three directions: product iteration and upgrading, diversified penetration of scenarios, and extension of the value chain. Eventually, a systematic development pattern for the industry is formed, providing long-term support for the activation and inheritance of cultural heritage and its market-oriented application [3].

Different categories of intangible cultural heritage have distinct characteristics in terms of their technical features and cultural expression logic, which determines that digital cultural creative products cannot adopt a homogenized development approach. To create digital intangible cultural heritage products with differentiated market advantages, innovation at the interaction level is the core focus. The design plan must match the cultural attributes of the corresponding intangible cultural heritage to optimize the presentation texture and user experience of the product. For traditional craftsmanship and folk art resources that focus on the process of skills and visual expression, through tactile simulation technology, custom content generation modules, and lightweight gamification interaction forms, intangible cultural heritage interaction experience platforms, pattern customization tools, and lightweight interactive cultural works can be developed. Such products retain the core cultural core of intangible cultural heritage while aligning with the usage habits of contemporary users, which can lower the cognitive threshold for the public and promote the dissemination and promotion of digital intangible cultural heritage in the consumer market.

Traditional intangible cultural heritage dissemination has long relied on offline physical exhibitions. The dual constraints of time and space have narrowed the cultural radiation range. The application of interaction technology provides a technical foundation for intangible cultural heritage to break through the limitations of a single scene. Digital interaction means can implant intangible cultural heritage content into multiple creative fields such as virtual exhibition halls, cloud tourism, digital entertainment, and interactive education. Immersive scene design can restore the real production process of skills and enhance the intuitive cultural perception of the audience; lightweight interaction functions can embed intangible cultural heritage elements into educational games, online general knowledge courses, and other carriers, allowing traditional culture to integrate into the daily learning and leisure scenarios of the general public. This multi-scenario integration application effectively expands the application boundaries of digital intangible cultural heritage resources [4].

The enabling value of interaction design is also reflected in the systematic construction of the digital intangible cultural heritage industry value chain. The entire industry has formed a self-circulating development logic: starting from the integration and sorting of cultural resources, followed by the research and development and implementation of interactive products, and then absorbing and absorbing user feedback to support subsequent secondary creation. This circular mechanism not only can continuously optimize the form of terminal products but also can revitalize the scattered intangible cultural heritage resources in the upstream of the industry, driving the secondary dissemination and derivative development of content in the downstream. Users' independent creation and social sharing behaviors can form an autonomous cultural dissemination effect, gradually establishing the public recognition foundation of digital intangible cultural heritage brands. Correspondingly, the industry's profit model has also expanded from a single product sale to brand operation, cultural IP incubation, and other directions, further expanding the industrial value space of digital intangible cultural heritage.

4. Platform-Driven Technical Governance and Rule-Based Governance Practices

The combination of interactive design and digital intangible cultural heritage has driven steady progress in the digital creative industry. Even so, many practical drawbacks still hold back high-quality industrial integration. Most of these problems stem from misplaced cultural presentation, monotonous user experience modes, loose industrial collaboration and incomplete industry supporting systems.

Many ongoing design practices fail to balance cultural inheritance and market applicability. Plenty of digital heritage creative works overly chase visual effects and interactive fun. Excessive pursuit of immersive scenes and gamified operations often sacrifices authentic cultural connotations, leaving final products with superficial content and lost traditional cultural characteristics. Many designers also ignore basic market investigation before product development. Designs that do not match real user habits tend to gain low public acceptance, with poor market adaptability and unsatisfactory commercial transformation effects [5].

Uniform and exclusive experience modes remain a common flaw in most existing digital heritage products. Most current interactive functions are tailored exclusively for young users, with complicated operation steps and single sensory experience. Such design settings ignore the usage needs of elderly groups and ordinary audiences of different ages, greatly limiting product coverage. Most products only allow users to browse and experience passively. There is little room for independent creation, interactive participation and social sharing. This lack of in-depth interaction keeps user stickiness at a low level, restricts secondary public

communication, and makes it hard for digital heritage projects to build lasting industrial influence [6].

Standardized industrial rules and evaluation systems are also missing in current industrial practice. No unified design specifications have been formed for digital ICH interactive creation, resulting in uneven product quality across the market. Current industry evaluation focuses too much on user experience effects, while ignoring measurable assessment of cultural inheritance quality and industrial economic benefits. The separation of design practice, cultural inheritance work and market operation also breaks the integrity of the industrial chain. This disjointed development prevents the digital heritage creative industry from forming large-scale, standardized and mature industrial development patterns [7].

5. Optimization Strategies for Interactive Empowered Industrial Integration

The integration of digital intangible cultural heritage and digital creative industries is still facing multiple practical constraints at the present stage. To address this development predicament, this study focuses on four aspects: design value orientation, user experience construction, industry collaboration model, and effectiveness evaluation system. It has developed a set of systematic optimization strategies, which can provide practical support for the deep integration and high-quality development of digital intangible cultural heritage creative industries.

The core of upgrading the quality of interaction design lies in finding the balance point between cultural inheritance and market performance. Currently, many digital intangible cultural heritage products have the common problem of superficial cultural expression and excessive commercialization in development. The root cause is that a clear value scale was not established in the design stage. Design practice should take the inheritance of the authenticity of intangible cultural heritage as the bottom line, systematically sort out the historical evolution, traditional craftsmanship logic and regional cultural characteristics of various intangible cultural heritage resources, and incorporate the original cultural details into the entire process of product development and interaction experience design; at the same time, combined with market operation data and user behavior characteristics, dynamically optimize the functional architecture and interface interaction of the products. This development approach can both safeguard the cultural core of intangible cultural heritage and adapt to the demands of mass consumption, promoting a positive interaction between cultural inheritance and industrial application [8].

Excellent user experience is the core advantage of digital heritage interactive products. Rich and easy-to-use interactive methods, including gesture operation, voice control and simplified lightweight interaction, greatly reduce the difficulty of public use. Customized experience paths fit the usage habits of users of different ages and different cognitive levels, allowing more groups to access and understand traditional culture through digital platforms. Beyond basic browsing and experience functions, the introduction of personal creation and social sharing enables users to participate in cultural dissemination independently [9]. This forms a stable interactive cycle of participation, co-creation and communication, effectively improving user adhesion, expanding public influence, and helping digital intangible heritage gain stable market recognition.

Sound cross-industry cooperation can effectively extend the industrial value chain of digital heritage. Joint participation of heritage researchers, design practitioners, technical developers and market operators builds a complete industrial service system. It covers resource sorting, creative design, product iteration, market promotion and IP derivative development throughout the whole process. Multi-party cooperation breaks the isolated development state

of single links in the traditional industry. It also enables digital heritage resources to be applied in emerging fields such as cloud tourism, online cultural education and virtual entertainment, so as to realize multi-directional value activation of traditional culture [10].

Unified industrial standards and complete evaluation systems are essential for long-term industrial development. Formulating targeted design specifications for digital heritage interactive products can standardize the uneven product quality in the current market. A complete evaluation system should take cultural restoration accuracy, actual user experience and industrial economic benefits as core assessment indicators. These quantifiable evaluation contents provide reliable reference for product upgrading and industrial optimization, and create a standardized and sustainable development environment for digital intangible cultural heritage innovation [11].

6. Future Research Prospects

Global digital cultural upgrading has reshaped the development mode of traditional intangible cultural heritage, making interactive design a key technical tool to fix the inherent flaws of conventional heritage preservation. Traditional ICH protection work has long relied on static file archiving, offline physical displays and passive video recording. This outdated working mode only focuses on resource retention, and rarely supports cultural dissemination, public participation or commercial transformation. In actual industrial practice, it helps upgrade the form of ICH cultural and creative products, expand application scenarios such as online exhibition, cultural education and cloud tourism, and lift the overall industrial value of digital heritage resources. Current industrial integration still has obvious shortcomings. Most mainstream digital heritage products overemphasize interactive effects and technical presentation, and pay insufficient attention to the inheritance of core cultural connotations. The imbalance between cultural authenticity and market adaptability creates superficial and repetitive user experience, which dilutes the unique aesthetic and cultural value of folk heritage. Unsound industrial cooperation rules and missing unified supporting standards also limit the large-scale and standardized development of the digital heritage creative industry.

Long-term high-quality development of digital intangible cultural heritage needs to follow two core principles: genuine cultural inheritance and reasonable market adaptation. All optimization work must retain the core cultural genes and contextual characteristics of traditional heritage. Upgrading diversified and age-friendly interactive experience systems can break the single and rigid interaction mode of existing products, and satisfy the personalized experience demands of users with different ages and cognitive levels. Building multi-party cooperation mechanisms that connect heritage inheritors, design workers, technical developers and market operators can form a complete and stable industrial development ecology. Formulating scientific and quantifiable evaluation criteria that cover cultural restoration accuracy, user experience feedback and industrial economic benefits can further promote the practical integration of heritage resources and digital creative industries. These multi-angle improvement measures coordinate the living inheritance of traditional culture and the iterative upgrading of modern industries. They deliver lasting and stable impetus for the innovative communication, creative transformation and sustainable modern development of intangible cultural heritage in the digital context.

7. Research Limitations

This research takes the integration of interaction design and the digital creative industry as the core perspective, and systematically explores the development logic and practical optimization paths of digital intangible cultural heritage.

This research adopts a qualitative analysis as the main research paradigm. Through theoretical induction and case review, it sorts out industry pain points and optimization directions. It did not introduce quantitative statistical data from user experience perception and industrial economic benefits dimensions. Without empirical data as a backing, the persuasiveness of these conclusions in guiding the actual operation and industrial upgrading of digital intangible cultural heritage may be somewhat compromised.

8. Conclusion

Our research combines interaction design with the digital creative industry, analyzing the development patterns and practical optimization methods of digital intangible cultural heritage. We focus on the actual industrial integration scenarios and design implementation applications. Intangible cultural heritage includes many categories such as traditional craftsmanship, folk literature, traditional performances, and folk customs. Each category of cultural heritage has its own unique cultural characteristics, inheritance methods, and development potential in the industry. We adopt a macroscopic overall research perspective and do not conduct detailed analysis of different subcategories of heritage. The development framework and design strategies we summarize are applicable to general industry operation rules, but lack refined design plans for specific heritage types. Our research is entirely centered on the local digital cultural environment in China, without involving cross-border cultural exchanges and international industry cooperation scenarios. The coverage of the research is limited.

Our research conclusions and optimization strategies are derived from literature review, theoretical derivation, and analysis of existing industry cases. These results conform to the basic development laws of digital cultural heritage industry.

Through theoretical induction and case summaries, we identify the problems and optimization directions in the industry. We lack quantitative data on user experience and industrial economic benefits. This issue weakens the empirical support of the research conclusions. The final research results have relatively limited guiding significance for the daily operation and industrial upgrading of digital intangible cultural heritage.

Future research can build on this foundation to further improve the classification standards of intangible cultural heritage. Researchers can conduct in-depth studies on traditional craftsmanship, performing arts, and folk culture, and design exclusive interaction solutions and industry integration models for different types of heritage. Traditional craftsmanship heritage with processes should prioritize immersive simulation interaction and experiential design to achieve skill inheritance. Performing arts resources such as opera and folk music can focus on optimizing spatial audio interaction and building immersive scenes. Regional-specific folk cultural heritage can expand social interaction design to promote scene-based derivative development.

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