

A Study on the Digital and Intelligent Design Pathways of Sino-Thai Cultural and Creative Tourism Products

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Abstract: With the advancement of the Belt and Road Initiative, comprehensive cooperation between China and Thailand has been increasingly strengthened. The tourism industry is experiencing rapid growth, and cultural and creative tourism products have become especially popular. Their innovative design and intelligent application have attracted widespread attention. Digital and intelligent design not only enhances the appeal of products and improves user experience but also boosts the market competitiveness of cultural and creative goods. Effectively leveraging digital technologies to innovate both product development and promotional strategies is essential for adapting to globalization and shifting consumer demands. This study explores how digital and intelligent design can be applied to Sino-Thai cultural and creative tourism products, aiming to enhance cultural exchange and promote the growth of the cultural tourism industries in both countries.

Keywords: Cultural and creative tourism; Digital and intelligent design; User-centered design

1. Introduction

Since the launch of the Belt and Road Initiative, cultural exchange and cooperation between China and countries along the route have been significantly enhanced, alongside improvements in infrastructure and economic collaboration. Among these, the partnership between China and Thailand is particularly notable, especially in the domains of tourism and cultural and creative products. As important media for cultural exchange, cultural and creative tourism products help strengthen mutual understanding and friendship between the peoples of both countries, while also fostering mutual economic benefits.

With the development of digital technologies, digital and intelligent design has become a key tool in enhancing the appeal and market competitiveness of such products. This paper aims to analyze the application of digital and intelligent design in Sino-Thai cultural and creative tourism products and explore how it can more effectively promote cultural communication and economic growth.

2. Literature Review and Theoretical Framework

2.1 Overview of the Belt and Road Initiative

Proposed by China in 2013, the Belt and Road Initiative (BRI) is a major international cooperation and development strategy. It aims to strengthen intercontinental connectivity between Asia, Europe, and Africa through transnational infrastructure development, economic cooperation, and cultural exchange. The initiative has not only promoted trade, logistics, and investment but also enriched intercultural dialogue, presenting new opportunities for the growth of cultural tourism and creative industries [1].

2.2 History and Current State of Sino-Thai Cultural Exchange in Tourism

Under the Belt and Road framework, cultural exchanges between China and Thailand have flourished. Cultural and creative tourism products, which embody rich cultural elements from both

countries, play a vital role in cross-cultural communication. However, existing research has primarily focused on how intelligent design improves user experience and market competitiveness, with limited attention to its cultural significance in a cross-cultural context.

This paper explores the unique value of intelligent design in enhancing Sino-Thai cultural exchange, arguing that such design is not merely a technological upgrade but a novel approach to fostering cultural identity and emotional resonance.

Through technologies like Virtual Reality (VR), Augmented Reality (AR), and Artificial Intelligence (AI), digital and intelligent design can deliver immersive experiences that move beyond static displays of text or images. For instance, VR allows users to virtually explore ancient Thai temples and experience Buddhist culture, while AR can enrich Chinese heritage souvenirs with real-time historical context, transforming cultural communication into a dynamic and interactive exchange.

Moreover, intelligent design facilitates deeper cultural integration and helps bridge cultural gaps through personalized recommendation systems powered by AI and data analytics. This enhances user engagement and cultural identification.

This paper innovatively proposes that intelligent design, when applied in cross-cultural settings, goes beyond traditional paradigms by emphasizing emotional interaction and dynamic communication, thereby reinforcing mutual cultural understanding in the global context [2].

2.3 Concept and Classification of Cultural and Creative Tourism Products

Cultural and creative tourism products combine the commercial attributes of tourism resources with the service qualities of cultural creativity. They showcase local cultural characteristics while enriching the travel experience.

These products are broadly categorized into tangible and intangible types. Tangible products include handicrafts, souvenirs, and regional delicacies. Intangible products cover digital content, cultural experiences, and creative services. Many AI-generated content (AIGC) products now also fall into this category. By integrating cultural expression into design, these products add value and enhance cultural identity, satisfying both the cultural pursuits of tourists and the economic needs of local communities [2].

2.4 Theoretical Applications of Digital and Intelligent Design

Digital and intelligent design refers to the application of digital and smart technologies in design processes. It incorporates advanced tools such as information technology, AI, and big data analytics to better identify and meet consumer needs.

In the context of cultural and creative tourism, this approach not only enhances visual and functional aspects but also offers immersive experiences through technologies like AR/VR, allowing users to understand cultural backgrounds in a simulated environment.

It also supports product customization and smart empowerment, enabling more personalized and diverse cultural consumption. Consumers can interact with others on digital platforms while exploring unique cultural products, contributing to a pluralistic value system and diversified cultural communication channels. This in-depth exploration of cultural value allows for a richer media representation of local culture [3].

3. Data Sources for Digital and Intelligent Design

3.1 Methods of Intelligent Design

Digital and intelligent design incorporates tools such as Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), big data, and AI to enhance innovation and improve product development processes. These technologies accelerate and refine everything from needs assessment to concept development, design, manufacturing, and market launch.

AI and big data also help designers analyze consumer behavior and market trends to identify popular design features. Techniques like the Analytic Hierarchy Process (AHP) can be used to pinpoint

and prioritize customer preferences.

Personalized customization is another core advantage. As consumers increasingly seek individualized products, digital design enables businesses to offer diverse options—color, size, function—to improve product appeal.

In tourism and creative product development, intelligent design helps designers assess market demand, forecast future trends, and rapidly iterate using tools such as simulations, prototypes, and generative AI platforms like MidJourney. This leads to improved market alignment and user satisfaction [4].

3.2 Data Collection and Analysis Methods

Web scraping techniques and traffic analysis tools are utilized to collect web analytics data and user comments. This digital data - gathering approach is crucial for uncovering latent consumer needs that may not be apparent through traditional methods. By analyzing online behavior patterns, such as search queries, product page views, and purchase histories, as well as user - generated content like reviews and social media comments, we can identify emerging trends, pain points, and preferences. This information is then used to refine design priorities and ensure that intelligent - designed products better meet consumer expectations.

In the data analysis phase, a combination of descriptive statistics, content analysis, and multivariate regression is employed. Descriptive statistics are used to summarize and present the main characteristics of the dataset, providing a clear overview of the data distribution. Content analysis is applied to qualitative data, such as interview transcripts and user comments, to identify recurring themes, patterns, and meanings. Multivariate regression analysis, on the other hand, is used to quantitatively examine the influence of various intelligent design elements on product success metrics, such as sales volume, customer satisfaction, and brand perception. This integrated analytical approach provides a comprehensive and multi - dimensional understanding of how intelligent design impacts market performance and user experience in the Sino - Thai cultural tourism product sector.

3.3 Research Hypotheses and Model Construction

Traditional design approaches for cultural products predominantly hinge on designers' intuitive judgments and immediate market feedback. This conventional paradigm often overlooks the intricate interactions among cultural heritage, individual consumer preferences, and technological capabilities. In contrast, digital and intelligent design methodologies leverage advanced technologies such as big data analytics, artificial intelligence (AI), and virtual reality (VR). These tools enable the systematic conversion of consumer behavior insights and market trends into data-driven design strategies.

This research posits that digital and intelligent design not only streamlines the design process but also facilitates real-time modifications and customized solutions tailored to the evolving demands of cultural consumers. To operationalize this concept, the study presents an enhanced intelligent design framework that integrates a Cultural Demand Response Mechanism (CDRM) as its central component. The CDRM employs dynamic analysis techniques to align cultural content with user requirements by meticulously examining factors such as cultural affinities, behavioral patterns, and emotional stimuli.

Distinct from traditional design models, this innovative framework prioritizes diverse cultural representations and personalized consumption experiences. It empowers designers to predict market trends and enhance cultural communication effectiveness. By advancing the theoretical underpinnings of cultural and creative product design, this model offers a versatile approach adaptable to various cross-cultural settings. Through the optimization of product design and user experience, intelligent design significantly bolsters consumer purchasing intent.

To test these assumptions, the study constructs an analytical model to explore the relationship between design inputs and outputs—see Figure 1.

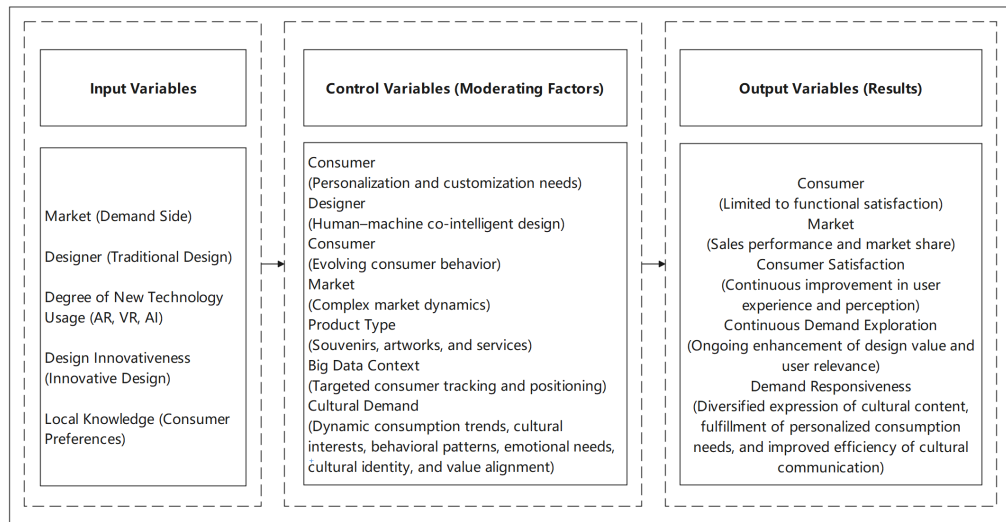


Figure 1. Model of Intelligent and Digital Design: Mechanism of Culturally Responsive Demand

To ensure the accuracy and broad applicability of the research findings, the model may also incorporate several control variables, such as product type, target market, and cultural background. These variables are essential, as they may significantly influence the final research outcomes. For example, different product types (e.g., souvenirs, artworks, etc.) may vary in terms of the effectiveness of intelligent and digital design applications. Similarly, distinctions between target markets (such as domestic vs. international markets) can impact product performance. Cultural background differences may also affect consumer acceptance and preferences regarding cultural and creative products [5].

The model presented above illustrates how intelligent and digital design can enhance the market competitiveness of tourism cultural and creative products through the application of advanced technologies and innovative design. It also highlights the critical role of control variables—such as product type, target market, and cultural background—in shaping the final outcomes. Through this model, systematic strategic recommendations can be developed for the design and marketing of tourism cultural and creative products.

By employing this intelligent and digital design model, it becomes possible to gain a deeper understanding of how specific technological applications and design innovations contribute to improved market competitiveness in the tourism and cultural creative sector. Moreover, this model sheds light on how such advancements influence consumer behavior and market performance. As a result, it not only validates the practical benefits of intelligent and digital design but also offers valuable guidance and strategic insights for the industry.

4. Digital-Intelligent Design Strategies for Sino-Thai Cultural and Creative Tourism Products

4.1 Product Design and User Experience

Within the framework of digital-intelligent design, the incorporation of interactive design elements—such as touchscreen functionality and augmented reality (AR) technology—enables users to engage with cultural heritage through tourism souvenirs or mobile applications, thereby enjoying a deeper and more immersive experience.

Customization and personalization services are also crucial. By leveraging data analytics to understand the preferences of various user groups, designers can tailor products to meet broader and more diversified consumer needs. Personalized services not only enhance the uniqueness of cultural products but also improve user satisfaction and loyalty, as consumers feel that the products are better aligned with their individual tastes and requirements.

4.2 Technological Integration and Innovative Applications

Various emerging technologies can be integrated into Sino-Thai cultural and creative products. These include advanced digital manufacturing methods such as 3D printing, virtual reality (VR),

artificial intelligence (AI), and big data analytics. Such integration not only improves design precision and production efficiency but also expands the functional possibilities of cultural products.

AI, for instance, can support personalized travel recommendation systems by analyzing users' historical behavior and preferences. Meanwhile, VR enables users to experience immersive virtual tours of cultural heritage sites and natural landscapes from the comfort of their homes. These innovative applications redefine the boundaries and spatial dimensions of cultural products, offering consumers new modes of cultural exploration. Through such technological integration, cultural and creative products can deliver richer, more personalized experiences that meet the high standards and diverse demands of contemporary consumers.

4.3 Design Principles and Implementation Strategies

Effective digital-intelligent design adheres to a set of clear principles and implementation strategies to ensure practicality and foresight. In the design of cultural and creative products, it is essential to enhance rather than replace the value of traditional cultural elements. This requires that design teams have a deep understanding of both user needs and the local cultural context, ensuring that design solutions harmoniously integrate with culture and enhance the user experience. Additionally, the use of environmentally friendly materials and energy-efficient technologies supports environmental protection and aligns with modern consumers' preference for sustainable products[6].

From an implementation perspective, a collaborative, cross-disciplinary approach is key. This involves integrating the expertise of designers, technologists, market analysts, data scientists, and AI specialists to ensure that design solutions are innovative, practical, and adaptable.

4.4 Design Challenges and Solutions

While digital-intelligent design brings opportunities for the development of Sino-Thai cultural and creative tourism products, it also presents several challenges. The complexity of technological integration requires substantial technical support. Moreover, balancing cultural authenticity with technological innovation is a significant concern.

To address these issues, several strategies can be considered. First, reducing the cost of technology adoption can be achieved through partnerships between government agencies and private investors, facilitating resource sharing and accelerating technological advancement.

Second, to ensure that cultural heritage is not compromised by technology, it is necessary to establish regulatory frameworks and standards that guide designers and developers in respecting and preserving cultural values during the innovation process.

Third, ongoing community engagement and public education campaigns can raise awareness and acceptance of digital-intelligent design[7]. This not only helps build public trust in new technologies but also fosters broader social support and understanding, thereby promoting the healthy development of digital-intelligent design in the cultural and creative sector.

5. Impact of Digital-Intelligent Design on Sino-Thai Cultural and Creative Tourism Products

5.1 Enhancing User Experience and Psychological Engagement

Digital-intelligent design is rooted not only in technological innovation but also in the enhancement of user experience. By integrating AR, VR, and AI technologies, digital-intelligent design offers users immersive experiences that are especially critical in the context of Sino-Thai cultural and creative tourism products. These products serve as carriers of regional culture, and effective cultural transmission through technology—while enhancing user engagement and emotional involvement—is central to the success of digital-intelligent design.

AR and VR technologies, for instance, move beyond traditional visual engagement to offer interactive and immersive cultural experiences. In Thai temple-themed cultural products, VR can transport users to historical sites through virtual travel. In Chinese heritage-inspired products, AR allows users to scan artifacts with mobile devices to access historical narratives, character backgrounds, and cultural insights. These technologies make cultural content more vivid and accessible, stimulating user participation and emotional resonance.

Additionally, AI and big data analytics can provide personalized cultural experiences by analyzing user behavior and preferences. In Thai handicraft e-commerce platforms, for example, AI can recommend specific products or cultural activities that align with users' interests based on their browsing and purchase history. This level of personalization enhances user satisfaction and increases purchasing intent.

From a psychological perspective, digital-intelligent design—through immersive and personalized experiences—strengthens emotional engagement. Beyond functionality, users often seek emotional connection and cultural identity during product interaction. These experiences turn products into emotional bridges between users and culture, deepening cultural identity and brand loyalty.

5.2 Strengthening Market Competitiveness through Digital-Intelligent Design

Digital-intelligent design not only improves user experience but also significantly enhances the market competitiveness of Sino-Thai cultural and creative tourism products. The integration of technology makes design and production more efficient, shortening the time from concept to market. Enhanced product appeal and increased production agility create new opportunities for market expansion.

A key advantage lies in the responsiveness of digital-intelligent design to market demands, particularly the flexibility and adaptability during the design phase. In the development of Sino-Thai cultural products, designers can rapidly adjust designs using digital tools and test prototypes through rapid prototyping technologies. This streamlined process allows for quicker adaptation to market changes, improving product-market fit and competitiveness.

Moreover, the adoption of innovative materials and sustainable technologies further boosts product attractiveness. With growing global emphasis on sustainability, consumers increasingly favor environmentally friendly products. Digital-intelligent design enables the use of sustainable materials and techniques such as 3D printing to reduce material waste. For example, certain Sino-Thai cultural products utilize biodegradable bio-based plastics, catering to consumer demand for eco-conscious designs and enhancing their market advantage.

5.3 Cross-Cultural Integration and Dissemination of Sino-Thai Culture

Digital-intelligent design plays a crucial role in the cross-national dissemination and integration of Chinese and Thai cultures. Digital technologies allow cultural and creative products to transcend linguistic and geographical barriers, bringing cultural essence to a global audience. In doing so, such products not only generate economic value but also serve as dynamic mediums for cultural preservation and transmission[7].

Through digital media and interactive technologies, Sino-Thai culture is made more accessible and understandable. Unlike conventional cultural products, historically themed cultural creations emphasize narrative and symbolic depth in a contemporary context. For example, interactive exhibitions and digital art displays offer vivid portrayals of Thai Buddhism or traditional Chinese art[8]. AR can recreate Thai dance performances or Chinese opera in immersive formats, increasing cultural appeal and user participation. These applications move beyond traditional cultural communication, enabling audiences to engage deeply with cultural narratives through interactive experiences.

Furthermore, digital-intelligent design enables innovative global cultural dissemination[9]. Cultural content can be transformed into interactive games or animations, making it more engaging and suitable for younger audiences. With immersive VR experiences, users can virtually attend Thai festivals or Chinese celebrations, fostering cultural understanding and appreciation. The integration of digital technology with cultural content thus enhances cross-cultural interaction and builds greater cultural affinity among global consumers.

5.4 Promoting Sustainable Development and Circular Economy Practices

Beyond cultural dissemination, digital-intelligent design significantly contributes to sustainable development. By enhancing the efficiency and environmental performance of product development and distribution, it aligns with consumer preferences for sustainability[10].

One of its major strengths lies in enabling life-cycle management of products. During the design phase, digital tools allow for precise material calculations and design optimization, minimizing

resource waste. Technologies such as 3D printing reduce production waste and enable resource reuse. These methods help reduce carbon emissions and environmental impact at all stages—from design and production to packaging and transportation.

The principles of the circular economy are also embedded in digital-intelligent design. Many cultural products are created with recyclability and reusability in mind. For instance, designers may use biodegradable materials or modular structures that are easy to disassemble, prolonging the product lifecycle and facilitating post-use recycling. This approach aligns with global trends in environmental responsibility and meets growing consumer demand for green products.

5.5 Policy Recommendations and Implementation Pathways

To further enhance the positive impact of digital-intelligent design on Sino-Thai cultural and creative tourism products, it is recommended that governments and related enterprises take the following actions:

Enhance government support for digital-intelligent design: Governments should offer policy incentives and financial support to encourage enterprises to invest in digital technology R&D and application, accelerating the digital transformation of the cultural and creative industries. Partnerships with educational institutions should also be promoted to cultivate a pool of professionals with digital design expertise.

Promote international cooperation and cultural exchange: Collaborations with global design institutions and universities can facilitate technological exchange and cultural interaction between China and Thailand, laying a foundation for the global reach of cultural products.

Advance the standardization of green design: Establishing industry standards and certification systems for sustainable design in cultural products will encourage enterprises to adopt eco-friendly materials and technologies, supporting the long-term goal of sustainable development.

6. Conclusion

Against the backdrop of the Belt and Road Initiative, this study systematically explores the application pathways and far-reaching impacts of intelligent digital design in cultural and creative tourism products in China and Thailand. The findings reveal that intelligent digital design not only significantly enhances user experience and product competitiveness but also plays a crucial role in fostering cultural identity, cross-cultural communication, and cultural sustainability.

Firstly, by integrating cutting-edge technologies such as Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence (AI), intelligent digital design greatly enriches interactive experiences and personalized services. These technologies elevate the visual appeal and cultural expressiveness of products, enabling users to engage with cultural content in immersive virtual environments. This deepens users' understanding and appreciation of Chinese and Thai cultures, thus facilitating meaningful cultural exchange and fusion.

Secondly, digital design breaks through geographical and linguistic barriers traditionally faced in cultural dissemination, allowing Chinese and Thai cultures to reach broader global audiences. Within the framework of the Belt and Road Initiative, cultural and creative tourism products serve as vital mediums of bilateral cultural exchange. They not only contribute to the inheritance and revitalization of traditional culture but also inject continuous innovation and global competitiveness, thereby promoting cultural sustainability.

Moreover, intelligent digital design contributes significantly to the implementation of green design concepts and sustainable production practices. By incorporating environmentally friendly materials, energy-efficient technologies, and intelligent supply chain management, it reduces the environmental impact of products and fosters a green transformation and high-quality development of the cultural and creative industries in both countries.

Despite the multiple advantages uncovered in this study, certain limitations remain. The current research primarily focuses on technological applications and market performance, with less emphasis on the deeper impacts of digital design on local community culture and traditional craftsmanship. Future studies should explore the interaction between digital design and local cultural ecosystems to fully uncover its systemic value in cultural development.

Looking ahead, the continued advancement of emerging technologies such as AI, the Internet of Things (IoT), and 5G is expected to further elevate the role of intelligent digital design in the global cultural and creative industries. Balancing technological innovation with cultural preservation and integrating global design trends with local cultural essence will become critical issues for future research.

In conclusion, intelligent digital design not only serves as a driving force for innovation in Sino-Thai cultural and creative tourism products but also acts as a key mechanism for promoting cultural dissemination, enhancing cultural identity, and supporting sustainable development. As technology and culture continue to converge, digital design will play an increasingly vital role in advancing global cultural exchange and innovation.

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