

Research on the Path of AI-Empowered Cultural Exhibition and Cultural and Creative Transformation in Liaoning from the Perspective of Collaboration among Schools, Museums, and Enterprises

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Abstract

The national "Artificial Intelligence+" initiative and cultural digitization strategy provide new opportunities for the upgrading of the cultural and creative industries. Liaoning has abundant cultural and museum resources and a solid industrial foundation, but the transformation of cultural and creative industries still faces difficulties such as the lack of cultural translation methods, the rupture of cooperation between schools, libraries, and enterprises, the shallow application of AI, and the low efficiency of achievement implementation. This article is based on the perspective of school library enterprise collaboration, combined with the practice of Liaoning's cultural and creative industries, to construct a closed-loop transformation framework of "resource supply intelligent translation industry landing feedback optimization". It proposes a systematic transformation path from five dimensions: resource co construction, AI design system construction, collaborative R&D mechanism construction, market transformation channel expansion, and evaluation feedback mechanism improvement. The effectiveness is verified through the practice of school library enterprise cooperation. Research has shown that this model can effectively connect the conversion link of cultural resources to market products, improve design efficiency and cultural accuracy, and provide a replicable paradigm for the high-quality development of Liaoning's cultural and creative industries.

Keywords

School-museum-enterprise collaboration, AI empowerment, cultural relics and cultural creativity, transformation path.

1. Introduction

The report of the 20th National Congress of the Communist Party of China proposed to promote the national cultural digitization strategy and empower the high-quality development of the cultural industry. The 2025 Government Work Report clearly states the continuous promotion of the "Artificial Intelligence+" initiative, providing a technological path for the revitalization and utilization of cultural resources. The outline of Liaoning Province's "15th Five Year Plan" lists the integration of culture, sports, and tourism, as well as the revitalization and utilization of historical and cultural resources, as key directions, and proposes to build a unique cultural and creative industry system in Northeast China based on the province's cultural and museum resources. By 2025, there will be over 120 registered museums in the province, with annual sales of cultural and creative products exceeding 80 million yuan for museums in Liaoning Province and over 50 million yuan for the Shenyang Palace Museum, demonstrating significant potential for industrial development.

However, Liaoning's cultural and creative industries are still in the stage of factor driven development, with low efficiency in the transformation of cultural resources, prominent problems such as design homogenization, insufficient industrial collaboration, and lagging technological applications. Universities, cultural and museum institutions, and enterprises lack stable collaborative mechanisms, and there is a significant mismatch of resources. Generative AI provides technological possibilities for cultural visual translation and design innovation, but how to deeply embed AI into the entire chain of cultural and creative transformation, and solve industry pain points through collaboration between schools, libraries, and enterprises, is an urgent problem that needs to be solved [1].

This article is based on the long-term cooperation practice between the Cultural and Creative Center of Liaoning Media College, cultural and museum institutions, and local enterprises. From the perspective of school library enterprise collaboration, it explores the systematic transformation path of AI empowering Liaoning's cultural and museum cultural and creative industries, constructs a tripartite collaborative innovation mechanism, and provides theoretical and practical references for industrial upgrading.

2. The Practical Dilemmas of the Transformation of Cultural and Creative Industries in Liaoning's Cultural Exposition

Based on research conducted by multiple cultural and creative institutions in Liaoning, interviews with cultural and creative enterprises, and design practice data from universities, there are currently four core challenges in the transformation of cultural and creative industries in Liaoning.

2.1. The Cultural Visual Translation Lacks Systematic Methods, and Product Homogenization is Prominent

Liaoning's cultural and museum resources cover diverse cultural systems such as Hongshan, Liaojin, and Qingqian, with rich visual elements such as cultural relics patterns, architectural decorations, and folk symbols. However, existing cultural and creative designs mostly remain at the level of direct element replication, lacking in-depth exploration and modern translation of cultural semantics. Most products are conventional categories of cultural relic pattern printing and simplified styling, with similar IP products having similar forms and insufficient differentiation competitiveness, making it difficult to match the needs of young consumer groups. At the same time, the extraction and translation of cultural elements rely on the personal experience of designers, and a standardized method system has not been formed. The cultural connotation of cultural and creative products is insufficient, and the regional recognition is not strong [2].

2.2. The Collaborative Chain among Schools, Libraries, and Enterprises is Broken, Leading to Low Efficiency in Resource Allocation

At present, the development of cultural and creative industries in cultural and museum fields is mainly carried out independently by cultural and museum institutions or outsourced by enterprises, and the design and research and development capabilities of universities have not been fully integrated into the industrial sector. Cultural and museum institutions have access to core cultural resources, but lack professional design and research and development capabilities; Universities have talent and technological advantages, but lack real industry projects and market channels; Cultural and creative enterprises have operational capabilities, but high resource acquisition costs and weak research and development capabilities. The tripartite cooperation is mostly short-term project based, without forming a long-term stable strategic partnership. The mechanism for sharing interests and risks is lacking, and the flow of

resources is not smooth, resulting in a mismatch among the three parties and low overall industrial transformation efficiency.

2.3. The Shallow Application of AI Technology Makes it Difficult to Guarantee Cultural Accuracy

Generative AI has gradually been applied in cultural and creative design, but most of it remains at the level of effect rendering and sketch generation, without forming a systematic design method. On the one hand, AI generation is prone to problems such as misuse of cultural symbols and distortion of historical scenes, lacking cultural constraint mechanisms and making it difficult to ensure cultural accuracy; On the other hand, the AI design resources for Liaoning's regional culture are scarce, with a lack of localized prompt word templates and training datasets. The regional characteristics of the generated content are not prominent, which cannot support differentiated design needs and still require a large amount of manual adjustment. The role of technological empowerment has not been fully utilized [3].

2.4. The Mechanism for Transforming Achievements is Not Perfect, and the Efficiency of Implementation and Transformation is Low

From design schemes to product implementation, cultural and creative industries involve multiple links such as copyright authorization, sample production, and channel sales. Under the current model, there is a clear disconnect between design and the market. University design works tend to be conceptual and lack considerations for mass production feasibility and market positioning; Cultural and museum institutions have long development cycles and slow iterations, making it difficult to quickly respond to market changes; The cultural depth of enterprise product development is insufficient, and its competitiveness is limited. At the same time, there is a lack of rapid prototyping and small-scale production in the pilot stage, resulting in high implementation costs and long cycles. Most designs are stuck in the rendering stage, which hinders industrialization transformation.

3. The Overall Logic of AI Empowering Cultural, Museum, and Creative Transformation under the Cooperation of School, Library, and Enterprise Associations

In response to the above difficulties, with AI as the core empowerment tool and school library enterprise cooperation as the organizational model, a closed-loop transformation framework of "resource supply intelligent translation industry landing feedback optimization" is constructed to achieve the full chain connection of cultural resources from digital collection to market-oriented application.

The three parties each perform their respective duties and collaborate: cultural and museum institutions provide authoritative cultural resources, data authorization, and content review to ensure cultural accuracy; As the core of research and development, universities undertake the functions of visual gene extraction, AI design method research, solution development, and talent supply, providing technical and talent support; The enterprise is responsible for sample production, market promotion, and channel sales, converting design proposals and providing feedback on market demand. AI runs through the entire process, empowering every step of resource digitization, design generation, effect evaluation, and iterative optimization to improve the efficiency and quality of the entire chain.

This framework breaks the limitations of single subject development, integrates cultural resources, technological research and development, and market operation advantages through resource sharing and complementary advantages, and forms a development path of "cultural soul casting, technological empowerment, and industrial landing", promoting the

transformation of Liaoning's cultural and creative industries from extensive development to refinement, intelligence, and industrialization [4].

4. The Implementation Path of AI Empowering the Transformation of Liaoning's Cultural, Museum, and Creative Industries under the Cooperation of School, Library, and Enterprise Associations

4.1. Building a Liaoning Cultural and Creative Visual Resource Library to Strengthen the Digital Foundation

Led by cultural and museum institutions and involving technical teams from universities, we will jointly build a standardized Liaoning cultural and museum visual resource knowledge base to provide data support for AI design. One is to carry out visual data collection of cultural relics, targeting representative resources such as Hongshan Culture jade, Liao and Jin architectural decoration, Qing Dynasty palace cultural relics, and Manchu intangible cultural heritage. High definition images and 3D data will be collected to extract elements such as patterns, shapes, and colors, establish a three-layer mapping relationship of "cultural semantics visual symbols design parameters", and complete digital annotation of more than 100 cultural relics. The second is to establish a resource sharing mechanism, where the three parties jointly build a platform to achieve open access to resources. Cultural and museum institutions are responsible for reviewing and authorizing, universities are responsible for technical maintenance, and enterprises enjoy design access rights, balancing resource standardization and utilization efficiency [5]. The third is to build an AI specialized training set, construct a regional cultural dataset based on annotated resources, provide support for model fine-tuning, and enhance the regional adaptability of AI generated content.

4.2. Building an AI Assisted Design Translation System to Enhance Design Innovation Efficiency

Relying on the research and development capabilities of universities, we collaborate with enterprises to conduct research on AI assisted design methods, forming a systematic AI design process for cultural and creative industries. One is to build an AI prompt word template system for Liaoning cultural and creative industries, which summarizes standardized prompt word structures for different cultural IPs, product categories, and design styles, integrates cultural constraints, solves the problem of cultural deviation in AI generated content, and realizes the complete process of "cultural semantic input AI style exploration scheme iteration optimization". The second is to carry out multi tool collaborative design, integrate generative AI and 3D modeling software such as Midjourney and Stable Diffusion, establish a full process AI assisted method from concept generation to structural modeling, and shorten the design cycle by more than 40%. The third is to establish an AI design review mechanism, in which cultural accuracy standards are jointly developed by cultural and museum experts and university designers, and cultural verification is carried out on the generated schemes to avoid symbol misuse and cultural distortion.

4.3. Establish a Tripartite Collaborative Research and Development Mechanism to Connect the Design Innovation Chain

Establish a joint research and development center between schools, libraries, and enterprises to form a normalized collaborative design mechanism. One is to establish a joint project team for the development of key cultural and museum IPs, consisting of cultural and museum specialists, university faculty and student teams, and enterprise product managers, clarifying the division of responsibilities, and carrying out joint research and development according to the process of "cultural interpretation concept design AI generation scheme optimization

sample verification". The second is to promote a project-based collaborative model, using real cultural and creative projects as carriers. Universities integrate enterprise projects into curriculum teaching, students participate in design and research, enterprises provide market guidance, and cultural and museum institutions provide cultural support, achieving synchronous promotion of talent cultivation and product development. The third is to jointly build a research and development platform, relying on university cultural and creative centers and intelligent design laboratories, equipped with AI design tools, 3D scanning and physical sampling equipment, open to all parties, and providing hardware support.

4.4. Expand Diversified Market Conversion Channels and Promote Product Implementation and Application

Give full play to the role of enterprise market entities, link school library resources, and build a multidimensional achievement transformation system. One is to promote the transformation of graded products. Based on different market positioning, design schemes are divided into three categories: collection grade, mass consumption grade, and cultural and creative peripheral. Enterprises connect with the production supply chain to complete sampling, mass production, and packaging. Universities provide design optimization support, and cultural and museum institutions are responsible for authorizing supervision. The second is to expand diversified sales channels, relying on offline cultural and museum stores, e-commerce platforms, cultural and tourism scenic spots and other channels, and combining Liaoning's cultural and tourism integration scene to launch limited edition and co branded products; Incubate youth design brands and expand niche markets through university innovation platforms. The third is to promote IP authorization cooperation, integrate third-party resources to create a Liaoning cultural and cultural IP system, carry out authorization for local time-honored brands and cultural tourism enterprises, expand application scenarios, and empower rural revitalization and urban renewal.

4.5. Improve the Two-way Evaluation Feedback Mechanism and Continuously Optimize Iterations

Establish a closed-loop optimization mechanism of "market feedback design iteration industrial upgrading". One is to build a dual dimensional evaluation system, establishing evaluation criteria from cultural value and market value: the cultural dimension is evaluated by cultural and museum experts, examining the accuracy of culture and the degree of regional characteristics; The market dimension is the responsibility of the enterprise, which collects data such as sales volume, repurchase rate, and user evaluations to comprehensively evaluate the effectiveness of the product. The second is to establish a dynamic iteration mechanism, regularly summarize market feedback, combine changes in user needs, use AI to quickly carry out design iterations, launch upgraded products, and enhance market adaptability. The third is to establish a feedback mechanism, which will feed back industry practice experience to the construction of university teaching and resource libraries, continuously optimize course content, resource data, and AI design methods, and achieve mutual promotion and improvement between industry, academia, and research.

5. Practical Application and Effectiveness Analysis

The transformation path proposed in this study has been implemented in the cooperation between the Cultural and Creative Center of Liaoning Media College, Liaoning Provincial Museum, Shenyang Palace Museum, and three local cultural and creative enterprises. The practice period is 2 years, and more than 20 cultural and creative development projects have been completed, verifying the feasibility and effectiveness of the model.

5.1. Significant Improvement in Resource Utilization Efficiency

Through the joint construction of the cultural and museum visual resource database, the data collection and annotation of more than 120 representative cultural relics were completed, covering core IP such as Hongshan Culture Yuzhulong, Shenyang Palace Museum roof figures, and the resource utilization efficiency was improved by more than 60% compared with the traditional model. Designers can directly obtain standardized visual elements and cultural descriptions without the need for multi-party communication and on-site shooting, greatly reducing resource acquisition costs while ensuring the accuracy of cultural elements, laying the foundation for mass design and research and development.

5.2. Double Improvement of Design Efficiency and Quality

After applying AI assisted design system, the design cycle of cultural and creative solutions has been shortened from an average of 21 days to 8 days, with an efficiency improvement of 62%. Totally 78 sets of cultural and creative and packaging design schemes have been completed, among which the sales volume of "Shenyang Palace Museum roof figures Cup", "Blue Rhythm Golden Flower Portable Comb Set" and other single products has exceeded 1000 pieces. By May 2026, the cumulative sales volume of cooperation projects has reached more than 500000 yuan. The AI generated solution has undergone cultural review and manual optimization, with a cultural accuracy compliance rate of 92%, effectively solving the problem of cultural deviation. The product has distinct regional characteristics and significantly improved market recognition.

5.3. Outstanding Collaborative Education Results

Relying on the collaborative mechanism between schools, libraries, and enterprises, real cultural and creative projects have been integrated into the teaching of visual communication design. Over 120 students have participated in practical activities, and their works have won more than 50 awards in provincial-level and above competitions, with 3 works achieving industrial implementation. Students have not only mastered AI assisted design skills, but also improved their cultural understanding and market awareness. The quality of talent cultivation has significantly improved, providing localized design talents for Liaoning's cultural and creative industries, forming a positive interaction between talent cultivation and industrial development.

5.4. Preliminary Formation of Industrial Synergy Ecology

Through joint research and development and benefit sharing mechanisms, the three parties have established a stable long-term cooperative relationship, breaking the limitations of single project cooperation. The "cultural and creative+AI+design" model jointly created is gradually expanding to the fields of Anshan industrial cultural and creative, Manchu intangible cultural heritage, etc., forming a replicable collaborative innovation paradigm, providing a practical basis for the cluster development of cultural and creative industries in Liaoning, and also providing reference samples for other cities in the province.

6. Conclusion and Prospects

The AI empowerment model under the cooperation of schools, museums, and enterprises is an effective path to solve the pain points of cultural and creative transformation in Liaoning and promote high-quality industrial development. By jointly building a resource library, constructing an AI design system, establishing a collaborative research and development mechanism, expanding conversion channels, and improving feedback loops, the entire chain from cultural resources to market products can be effectively connected, achieving the unity of cultural value, technological value, and market value. This model not only leverages the efficiency advantages of AI, but also ensures cultural accuracy and market adaptability through

tripartite collaboration, providing new ideas for the upgrading of local cultural and creative industries. It has practical significance for promoting the creative transformation and innovative development of Liaoning's regional culture.

In the future, we can continue to deepen from three aspects: firstly, we can deepen the application of AI technology, explore the full process intelligent design combining big language models with generative AI, and enhance cultural semantic understanding and creative generation capabilities; Secondly, expand collaborative entities and application scenarios, introduce more intangible cultural heritage institutions, cultural and tourism enterprises, and county-level entities to empower rural revitalization and urban brand building; The third is to improve the mechanism of benefit distribution and long-term collaboration, stimulate the participation of all parties, and build a sustainable ecological system for Liaoning's cultural, museum, and creative industries.

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