

The Value Logic, Challenge and Development Path of Traditional Handicraft Empowered by Artificial Intelligence Technology

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Abstract. Artificial intelligence technology provides a new possibility for the inheritance and innovation of traditional handicrafts, and its enabling logic is reflected in three dimensions: value logic, challenge, and development path. By means of intelligent design assistance, process optimization, and digital marketing, AI technology can enhance the creativity and adaptability of traditional handicrafts and promote their modernization and transformation. However, this process is faced with challenges such as the lack of technological adaptation, the inherent conflict of cultural values, and the limited impact on the transformation of the economic model. Based on the analysis of technology, culture, and economy, this study emphasizes the need to effectively promote the development of artificial intelligence technology, alleviate the cultural conflict when artificial intelligence technology empowers traditional handicrafts, and avoid resistance to the reconstruction of the value chain. The integration of AI and traditional handicrafts needs to seek a balance between technological innovation and cultural inheritance in order to achieve a win-win situation of cultural protection and industrial development.

Keywords: Artificial intelligence, traditional handicrafts, cultural inheritance, technological empowerment

1. Introduction

Under the impact of globalization and digitization, traditional handicrafts, as an important part of human cultural heritage, are facing severe challenges such as inheritance fault, market shrinkage, and so on. At the same time, the rapid development of artificial intelligence technology provides a new possibility for the revival and innovation of traditional handicrafts. Artificial intelligence technology refers to the theory, method, technology, and application system that simulates, extends, or enhances human intelligence through computer systems. Its core goal is to make machines have the ability of human intelligence such as perception, reasoning, learning, planning, decision-making and natural interaction, and even surpass human beings in some fields; traditional handicrafts refer to the technology and art form that mainly rely on the craftsmen's skills and experience and use natural or traditional materials to make objects of practical or artistic value. It usually carries national culture, historical memory, and regional characteristics, and is an important part of the

intangible cultural heritage. At present, many studies, such as "AI Resurrection Cultural relics", have reflected many advantages of artificial intelligence technology in enabling traditional handicrafts, but they are faced with many challenges in the process of application, such as the digital transformation of traditional skills, the adaptation of man-machine cooperation, ethics and intellectual property disputes, and so on. Therefore, how to balance the relationship between technological innovation and cultural inheritance and explore the sustainable development path of artificial intelligence enabling handicrafts has become a key problem to be solved urgently. This paper will discuss the three dimensions of value logic, practical challenge, and development path, in order to provide theoretical reference and practical enlightenment for the digital transformation of traditional handicrafts.

2. Artificial intelligence technology empowers the value logic of traditional handicrafts

Artificial intelligence can improve the inheritance efficiency of traditional handicrafts and solve the bottleneck of traditional crafts in standardization and production cycle. "the digitization of traditional handicrafts is mainly to reproduce and restore the information of handicrafts in physical space and empirical state, so as to transform it into a shareable and renewable digital form, and realize information collection, storage, display and dissemination, and combine with the needs of digital life." [1] With the help of computer vision and deep learning, AI can accurately decompose the craftsman's millimeter movements, transform the hidden experience into a standardized data model, and generate design patterns, which can help craftsmen iterate creativity quickly, improve design efficiency, and reduce the cost of trial and error. For example, AI's automated design, such as generative versus network GAN, can quickly generate traditional pattern variants and assist craftsmen, thus shortening the creative cycle. It automatically disassembles complex orders into standardized components (machined by machines) and core process components (completed by craftsmen) through the AI system, reducing the working hours of a single product by 55% while retaining manual value. At the same time, computer vision (CV) can be used to detect defects and improve the efficiency of quality control, such as ceramic glaze crack identification. In the existing experiments in China, Jingdezhen ceramic enterprises introduced AI quality inspection, and the rate of good products increased by 15%.

Artificial intelligence technology makes traditional handicrafts have innovative development in cultural value, and promotes the cross-cultural spread of traditional handicrafts. Because of its close relationship with people's lives, handicrafts have a wide range of acceptance, which can make it easier for recipients to absorb the cultural content; artificial intelligence technology makes handicrafts coruscate with new vitality. Professor Fang Xiaofeng once proposed that AI technology can extract "cultural genes" (such as symmetry, auspicious meaning) and re-create them. For example, AI tools help people to make cultural symbols have modern expressions and integrate traditional aesthetics into modern design. Among them, artificial intelligence technology promotes the flow and dialogue of traditional handicrafts around the world by removing language barriers, reconstructing narrative methods, establishing digital ties, and so on. In addition, with the help of the application of AI technology, it breaks the limitations of time and space and skills in the creation of traditional handicrafts. Through the analysis of massive historical patterns, shapes, and skills, AI can generate new patterns and forms that not only retain traditional aesthetic genes but also have a sense of modern design, and provide endless creative inspiration and reference schemes for craftsmen. This is a new mode of "AI design, manual production". As a result, traditional handicrafts are no longer static exhibits in museums, but "living" cultures that can continue to produce new content and new expressions, and their cultural value changes from "inheritance and protection" to "innovative

evolution". For example, Miaojiang craft culture has developed into a tide play IP, which has a variety of peripheral products and is deeply loved by young people, so that traditional handicrafts can be spread effectively.

Artificial intelligence technology has improved the economic market ecology of traditional handicrafts and greatly extended the industrial chain. The industrial chain of traditional handicrafts includes three links: production, dissemination, and sales, in which artificial intelligence technology improves the efficiency of production links, spreads more widely, and determines sales targets more accurately. "The traditional handicraft industry is facing unprecedented severe challenges in the complex situation of the continuous upgrading of mass consumption and increasing global competition, and the transformation to the whole industry chain has become the key strategy to break the situation. " [2] In the production process, AI visual inspection and other technologies assist craftsmen in quality control and reduce the defective rate. The intelligent management system optimizes the procurement and inventory of raw materials, thus reducing production costs as a whole and making handicrafts more competitive in price. Among them, the Ministry of Industry and Information Technology's "2022 traditional process Digital Transformation White Paper" states that AI technology can significantly increase the national non-legacy workshop average revenue growth rate to 12.7%, which can not be ignored; in handicraft communication, AI intelligent tools significantly reduce learning costs. Taking the Yixing Zisha teapot as an example, AR glasses and AI hand motion capture technology correct apprenticeship techniques in real time, shortening the training period from 3 years to 1.5 years, greatly improving learning efficiency and laying an efficient foundation for its cross-cultural communication. In the sales link, AI helps traditional handicrafts achieve multi-dimensional value enhancement. On the one hand, through the combination of blockchain and AI technology, copyright confirmation and traceability services are provided for non-heritage works to protect the rights and interests of creators, while giving birth to new business type, such as virtual collections and digital collections, to broaden the channels of value realization; on the other hand, the use of big data user portraits and recommendation algorithm to accurately push traditional handicrafts to minority enthusiasts and high-end consumer groups to solve the problem of limited product popularity. Taking Miaoyin technology as an example, the dynamic NFT of "digital Miaoyin" is generated through AI, and the virtual collection is sold online, and then the physical products are made by craftsmen to form a "virtual + physical" double-income model, which significantly improves the sales revenue.

3. Artificial intelligence technology empowers the challenge of traditional handicraft

The technology of artificial intelligence to empower traditional handicrafts is not yet mature, and its algorithm efficiency logic is in contradiction with the cultural value logic of traditional craftsmanship. AI pursues high-speed optimization, while traditional technology pays attention to time pressure and cultural connotation. For example, in the Japanese kimono pattern generation project in 2022, AI combined sacred "family patterns" with taboo patterns due to the deviation of training data, which caused controversy and exposed the one-sidedness of the deconstruction of cultural symbols and the deviation of results. In addition, AI technology faces high early investment and rapid iterative pressure in traditional process applications, and complex tasks such as 3D motion capture and material database construction are beyond the capacity of ordinary manual workshops, and the rapid evolution of AI technology is in sharp contrast to the slow cycle characteristics of traditional processes, which aggravates the adaptation problem. As Zhong Ziwei and Liu Hao believe, through image segmentation, feature extraction, and other technical means, AI can identify the visual features of cultural symbols and combine these visual features with semantic information,

thus forming a comprehensive and in-depth understanding of cultural symbols [3]. In addition, the application of artificial intelligence technology in production still has the problem of a lack of existing data; there are still many kinds of traditional handicrafts that have not built a perfect database, such as Hezhe fish skin painting, and other minority technologies lack sufficient training data.

When artificial intelligence technology empowers traditional handicrafts, it brings the conflict of cultural value, which is mainly reflected in the crisis of skill ontology and the tendency of homogenized creation. The crisis of skill ontology stems from the fact that AI's mechanized production logic runs counter to the core values of traditional handicrafts. For example, Japan's "national treasure of the world" system excludes AI from participating in the core process, fearing that machines will intervene to dispel the sanctity of "craftsmanship"; at the same time, young craftsmen rely too much on AI tools, resulting in insufficient skill training and degradation of basic abilities. Take AI seal cutting software as an example, hindering the inheritance and development of traditional handicrafts. The problem of homogenization creation is due to the neglect of cultural diversity when generating works by an AI algorithm, "As the main body of artistic creation, artists play a decisive role in the process of artistic creation. artists process and produce their personal thinking and aesthetics in artistic creation activities. each work of art embodies the artist's unique style and innovative characteristics. " [4] Such as the convergence of Miao silver jewelry design with the assistance of AI, which weakens the scarcity and artistic value of handicrafts and affects market competitiveness and cultural vitality. The conflict between these technologies and cultural ideas not only impacts the inheritance of traditional handicrafts but also threatens the cultural foundation of its long-term development.

Artificial intelligence technology empowers traditional handicrafts to impact the transformation of the economic model, including difficulties such as resistance to the reconstruction of the value chain. AI technology providers (such as algorithm companies, platforms) may occupy the dominant position of the value chain through data control (user preference analysis, design template), squeeze the decision-making space of traditional craftsmen and make them become technology executors, resulting in the technology side dominating the value chain; moreover, the value-added benefits after technology empowerment may flow to the enterprises that master AI tools, rather than craftsmen, resulting in an imbalance in benefit distribution. For example, cloisonné's "front shop and back factory" model has the problem of conflict between the traditional distribution system and digital direct sales channels. The experienced craftsman's experience of "watching fire" loses value, causing the inheritance of the master-apprentice system to break; at the same time, the bargaining power of craftsmen may be weakened by the technology platform, and some AI design platforms are drawn into more than 30%. In addition, the market perception is biased, consumers are less willing to pay for the "AI auxiliary" tag, and research shows that 63% of collectible-grade buyers refuse to participate in AI works.

When artificial intelligence technology empowers traditional handicrafts, it brings challenges to the transformation of the economic model. AI technology providers analyze user preferences and provide design templates through algorithms, controlling the key links from design to production, making traditional craftsmen from independent decision-makers to simple technology executors, and can only replicate according to the scheme generated by AI. This transformation not only compresses the craftsmen's independent innovation and decision-making space but also weakens the independence of handicrafts in the economic chain. Most of the value-added income after technology empowerment goes to technology companies, not craftsmen, resulting in a serious imbalance in the distribution of benefits. By virtue of their monopoly on data and control of market

discourse, technology companies further expand the gap in profit distribution, while craftsmen, as individuals, face the multiple pressures of lack of funds, rising costs, and insufficient popularization of technology. In the distribution of benefits, there has always been a disadvantage, or it can not guarantee the basic reproduction capacity. Taking the traditional "front shop and back factory" model of cloisonne as an example, the rise of digital direct marketing channels has had a great impact on the traditional distribution system, and the "watching fire" skills formed by experienced craftsmen have gradually lost their value. as a result, the cultural depth and artistic value of traditional craftsmanship have been weakened. At the same time, the master-apprentice inheritance system is facing a fracture crisis due to technological shock; the apprentice has lost the opportunity to learn the core skills, and the whole industry is facing a talent gap. In addition, the high percentage of the technology platform further reduces the craftsman's profit space, and some platforms charge more than 30% of the service fee for each transaction, while adding high technology use costs, making it difficult for craftsmen to bear the high economic burden. As a result of this multi-pressure superposition, the economic benefits of craftsmen can not be compared with those of technology companies, and it is also difficult to balance the dual challenges of their own survival and process inheritance. The deviation of market perception further aggravates this dilemma. 63 per cent of collectible buyers explicitly refused to pay the same price for works created by AI, mainly because these consumers believed that AI lacked "humanization" and "emotional input", resulting in a decline in both the cultural value and market value of handicrafts. This cognitive bias not only affects the economic benefits of craftsmen but also hinders the normal operation of the whole value chain, and further leads to the contradiction between technological empowerment and cultural protection. As a result, traditional handicrafts face more and more practical challenges in the process of adapting to technological empowerment.

4. The development strategy of traditional handicraft empowered by artificial intelligence technology

At the technical level, the application of artificial intelligence technology in the field of traditional handicrafts mainly needs to improve production efficiency, optimize design, and enhance user experience. "At present, traditional handicraft-related industries are facing many challenges, and combining with digital technology has become a path for handicrafts to seek survival and development." [5] Through the development of a virtual inheritor system, combined with VR/AR technology to simulate master techniques, it can effectively help apprentices to master complex craftsmanship; at the same time, "Virtual reality environment provides a safe and harmless learning platform for beginners to learn and practice handicrafts without worrying about making mistakes and wasting materials." [6] The low-threshold AI course based on a mobile phone reduces the difficulty of technology popularization and benefits more small manual workshops. In the aspect of design optimization, generative AI combined with traditional pattern extraction is used to generate a design pattern that not only conforms to modern aesthetics but also retains cultural connotation, which not only draws lessons from the case of digital preservation of lacquer texture in the Palace Museum, but also combines the needs of personalized customization. In addition, the combination of AI to generate 3D models and AR technology allows users to participate in the design process and modify it in real time, and then complete the final product through the traditional process, realizing the combination of "virtual + physical", which not only enhances the sense of user participation, but also enhances the market vitality of traditional skills.

In terms of cultural inheritance, artificial intelligence technology can help traditional handicrafts break through the limitations and realize the spread of innovation. On the one hand, cross-border

integration of literature and tourism project, with the help of AI guide, VR scene restoration and other means to create an immersive experience for tourists and broaden the spread of handicrafts; on the other hand, the use of AI to analyze historical documents and artifacts patterns, assist academic research, trace process evolution, and deepen cultural understanding. At the same time, promote the integration of handicrafts and modern design, science and technology, and other fields, stimulate new ideas, let traditional skills coruscate new vitality in the contemporary era, and realize the organic combination of cultural inheritance and innovation. It is worth noting that in this process, we must ensure cultural authenticity, ensure that AI design is not separated from the origin of the process, and establish a "human-led + AI-assisted" cooperation mode; in addition, in order to protect the traditional process core data and avoid its abuse or plagiarism in AI model training, we should promote the update of laws and regulations and bring digital process data and AI-generated works into non-heritage and intellectual property protection. At the same time, establish an authorization platform to ensure that when using core process data for AI modeling or commercial development, it is explicitly authorized by the inheritor, and a legally valid agreement is signed to clarify the scope of use and benefit distribution.

In the economic aspect, the process of artificial intelligence technology empowering traditional handicrafts can be optimized in many aspects to balance the path of technology and people-oriented, and avoid resistance to the reconstruction of the value chain. Specifically, technically retain the core manual links, let AI assist rather than replace; culturally, AI assists design innovation, craftsman-led design, and promotes new cultural identity; economically, protect the intellectual property rights of craftsmen, introduce a shared economic model, or establish a "craftsman cooperative" to ensure a reasonable economic return. This can not only promote the modernization of handicrafts, but also protect its cultural value and humanistic spirit, and achieve the balance between technology and humanism. In addition, artificial intelligence can be used to predict market demand, which can help manual workshops to reasonably plan the purchase of raw materials and production capacity. In addition, through accurate marketing, combined with artificial intelligence analysis of user preferences, and mining the trend data of e-commerce platforms, social media, and search engines, we can accurately predict the product preferences of different regions and different consumer groups. Such as color, shape, theme, and so on. Based on these insights, craftsmen and workshops can be guided to achieve "on-demand production" and "pre-sale customization", effectively reducing the risk of inventory backlog. For example, on e-commerce platforms such as Taobao and Etsy, targeted recommendations are made with the help of artificial intelligence to accurately push handicrafts to potential collectors, thus promoting economic development.

5. Conclusion

Artificial intelligence technology empowers traditional handicrafts, which not only provides a new technological path for non-heritage inheritance and innovation, but also constructs a unique logical system in the coordinated development of cultural value, economic value, and social value. Through intelligent design, production optimization and market expansion, AI technology can improve the efficiency and expressiveness of handicrafts and promote their integration into modern life, but at the same time, the low adaptability of technology, the inherent conflict of cultural values and the impact on the transformation of inheritors and economic models also constitute the key challenges in practice. In the future, artificial intelligence technology can empower traditional handicrafts, and perfect development strategies in the three aspects of technology, culture, and economy are indispensable. On the basis of respecting the humanistic core of handicrafts, we should build an open and inclusive cooperative ecology: on the one hand, strengthen the situational application of

technology, and develop lightweight and low-threshold AI tools. On the other hand, we will improve policy support and cross-border personnel training mechanisms to promote in-depth dialogue between handicrafts practitioners and technical experts. Only by exploring the integration and innovation in the balance of technological rationality and humanistic value can traditional handicrafts achieve sustainable "creative transformation" with the help of AI, and become a symbol of the times to demonstrate cultural self-confidence.

References

- [1] Bo Yin. Application status and prospect of artificial intelligence in the field of traditional handicrafts [J]. Chinese Intangible Cultural Heritage, 2025, (04): 39-47.
- [2] Jing Yin, Yong an. Innovation, Integration and Symbiosis: research on the Transformation and upgrading Strategy of traditional Handicraft from the Perspective of Common Prosperity [J]. Furniture and Interior Decoration, 2024, 31 (11): 59-65.DOI: 10.16771/j.cn43-1247/ts.2024.11.009.
- [3] Ziwei Zhong, Hao Liu. Research on the integration of artificial intelligence into the visual design of non-legacy products [J]. Green Packaging, 2024, (03): 138142.
- [4] Yan Li. Research on the innovation of traditional handicrafts based on digital technology [D]. Guangzhou Academy of Fine Arts, 2023.DOI: 10.27041/d.cnki.ggzmc.2023.000038.
- [5] Hong Yang, Jingyi Ji. The present situation and influence prospect of generative artificial intelligence involved in traditional handicraft inheritance [J]. Cultural Studies of the Central Plains, 2025, 13 (04): 68-76.DOI: 10.16600/j.cnki.41-1426/c.2025.04.003.
- [6] Chunjuan Zhao. Research on Digital inheritance and display of Bamboo carving Craft from the Perspective of Cultural Heritage Protection [J]. Art Education, 2024 (3): 41-44.