

Smart Manufacturing and Traditional Cultural Sustainable Design: Reflections from Eastern Culture

Yaqi WANG^{a,1}

^a*School of Design Art, China Academy of Arts*

Abstract. The research starts from the thinking and analysis paradigm of "problem-reaction-response", through the interpretation and reconstruction of existing problems, and the "opportunity" to respond from the crisis. Finally, through the ascension of digital technology, the reshaping of industries across borders, and the empowerment of living states, we will break through the dimension of mere human and technological experience and return traditions to everyday life, thus exploring the construction of a new cultural ecology and innovation system on the basis of digital ecology.

Keywords. Traditional Culture, Smart Manufacturing, Design and Innovation, Integration of Science and Art, Digitization

1. Introduction

Modernity and tradition are seemingly opposites, but in fact they are united. Modernity originates from tradition and is an improvement and innovation of tradition, and it is because of the 'birth' of 'modernity' that 'tradition' was created. It is for this reason that in the process of cultural inheritance and innovation, the key to achieving unity between the two is inescapable. Design is the art of lifestyle, and as a material production "in the field", it must ultimately meet the needs of regional culture and diversity of life. Therefore, the relationship of the solution to the problem of regenerating the heritage of excellent traditional culture lies in the revitalized design of the regeneration of tradition. This kind of re-living is based on the development of traditional cultural ideas in the contemporary context, from the contemporary way of thinking, life form and aesthetic consciousness and other depth of exploration, is the manifestation of the spirit of the East in the trend of "science and art fusion" in the era of digital intelligence.

The study explores the contradictory relationship between traditional culture and modern society from a multi-dimensional perspective, and seeks to link it with the times and give it new vitality. This is a new era in which the power of design is used to inject fresh blood into traditional culture, and to consider and interpret the "changes" and "Unchanged" of "Revitalized" traditional culture in the current context. This is a reflection and interpretation of the "changes" and "Unchanged" of traditional culture in

¹ Corresponding Author, School of Design Art, China Academy of Arts, Zhuantang Straight Street, Hangzhou, Zhejiang Province, China ; Email: 332983004@qq.com

the current context, and the opportunities that lie in the cultural crisis. It is also a revelation of the innovative methods and theories of design-smart revitalization, further refining and optimizing the practice and experience of oriental design [1-3].

2. Revitalization and Smart Manufacturing

There are routines for things and rules for things to be done. Design is a creative activity of man-made things, a design narrative for people and life, research and exploration. In the framework of modern oriental society, when the inherent forms of traditional life are broken down and reorganized, and each living individual gradually becomes an unfamiliar object in the living scene, it is necessary to look at the relationship between people, people and things, and things and things with a new vision, and rediscover the "everyday" of the present.

The basis for exploring the revitalization and innovation of oriental culture lies in fully understanding and interpreting the lifestyle, concepts and consciousness and behavioral characteristics of oriental people, reconstructing a design observation and analysis system based on "people, things, objects, fields and circumstances", forming a basic system for the study of the development of man-made things that are the fulcrum and cause of each other, and bringing the aesthetic values contained in traditional The design research system is based on the "people, things, fields and situations" design observation and analysis system [4-6].

2.1. Reflections on revitalization

Culture is the sum total of the spiritual and material wealth created by human beings. In a sense, culture is life or, more simply, a collective term for the elements of human life: clothing, food, housing, travel, entertainment, use, spectacle and commerce. Human life, whether material or spiritual, does not have a single fixed pattern, but always evolves and changes as society progresses. Similarly, although the function of a design object, as a form of cultural materialization, is definite over time, the content of life contained within it is bound to change over a larger and more distant period of time as life patterns change.

From the perspective of modern design, 'revitalization is a more appropriate description of the current state of traditional cultural existence, whether by following tradition or discovering it. The evolution of things needs to be in tune with heavenly opportunities, and so does the will of man and his desire to innovate. Life is not only the source of cultural production, but also the source of the endless changes of things. In other words, the 'revitalization of traditional culture in the current context is to re-implant the seeds left behind by the predecessors in the soil of current life, so that they can be rejuvenated in the lives of people and adapted to the current social innovation and transformation.

Therefore, the revitalization and innovation of traditional culture should start from the historical dimension of the development of the times and culture, face up to the current situation and changes in social values and life patterns, rediscover their rightful place in the international context of "Globalization and local protectionism" in the post-epidemic era, and actively integrate into global competition and the development of world culture and art. In the post-epidemic era, globalization and local protectionism have gone hand in hand. At the same time, in the context of technologicalization, a new

paradigm of innovation is sought for the integration of science and art, injecting the new era of traditional culture revitalization and innovation.

2.2. Interpretation of smart manufacturing

In the context of the intelligent trend of the fourth industrial revolution, key technologies such as the industrial Internet of Things, big data and digital twin have been applied and strategically deployed to realize smart factories, and the intelligence of production technology has been extended from the product manufacturing stage to the design and creativity stage in the upstream of the industrial chain. The upgrade from "manufacturing" to "smart manufacturing" is the result of design relying on intelligent technology to deeply integrate and link a larger industrial network and cover more value links, making the "production of value" becomes a more advanced element of industrial competitiveness than the production of physical products.

The core concept of "unity of heaven and man", as the core concept of Eastern aesthetic thought, encompasses the correspondence between the individual and its surrounding ecological space, and the relationship between things and fields, and the implementation of this connection in creative activities, highlighting Eastern wisdom with digital intelligence innovation. The emergence of new technologies such as 5G communication and the Internet of Things has led to a renewed understanding of the interaction between people and things, and an examination of the connection between people and their surroundings.

In the face of user needs and the information ambitions formed by the service industry system, accurately positioning people and things in the system, stimulating the maximum effectiveness of the industry through the Internet of Things, and naturally connecting them to the user's daily life is a basic requirement for the intelligent and holistic development of the design and manufacturing industry in the future, and is also based on the national strategy of "China Smart 2025" and the organic integration of information and industrialization through the new technologies and new modes of things of "Internet+". Therefore, the "wisdom" of Design-smart emphasis the intelligent system, which refers to the integration of design and technology to promote the transformation and upgrading of production methods and business models with the help of new technology, new materials, new thinking and new methods, so as to achieve the transformation and upgrading of production and consumption structures. The future has come, and design and smart manufacturing, which manifests the composite characteristics of wisdom and intelligence, has become a new reality and inevitable [7-9].

3. Revitalizing innovation under the Smart Manufacturing System

The so-called "crisis" is, firstly, the lag of the material aspect of "culture" in relation to the economic construction; secondly, the modernization of "tradition" in the spiritual aspect of inheritance and transformation, i.e., the problem of the continuation and regeneration of traditional culture in the modernization context. The second is the question of the modern inheritance and transformation of "tradition" in the spiritual dimension, i.e., the problem of the continuation and regeneration of traditional culture in a modern context.

The humanistic emotions embedded in traditional culture are an important part of the beautiful and poetic life that people are seeking today. From the existing revitalization cases, we can find that the Design-smart system, through the ascension of digital intelligence technology, industry cross-border reshaping, and the empowerment of the living state, science and art deeply integrated to reawaken the inner vitality of traditional culture, so that tradition retains the temperature of life back to everyday life. This evolution and return allow the inheritance of traditional culture to break through the dimension of mere human and technological experience, making the construction of a new cultural ecology and innovation system on the basis of digital ecology a possibility in the future [10-12].

3.1. Digital Intelligence Upgrading: Industry Empowerment

In the face of the dynamics and uncertainty of the reorganization of the inherent forms of traditional life, product feedback and evaluation through big data analysis with artificial intelligence will become an important part of the innovative industrial model with user experience as the core, and provide the basic technical support for the corresponding flexible supply system solutions.

At the same time, the changing trend of lifestyle aesthetics has also prompted the traditional manufacturing model of "design - manufacture" to gradually move towards a design and intelligence model that combines creativity, manufacturing, capital and operations, strengthening the development of product design for lifestyle and conceptual service innovation, and increasing the The integration with information and data has been strengthened to promote the deepening of the connection between design production and intelligent life. This has led to the creation of new industry chains, creating realistic conditions for the promotion of digital infrastructure and industrial empowerment, as well as a forward-looking vision for the revitalization and innovation of Design-smart. This has important industrial development implications for the revival of traditional handicrafts, the most important material culture in traditional culture.

2020, Alibaba released the Rhinoceros Smart Manufacturing, which intervenes in the garment processing industry through micro-innovation of Internet intelligence technology. Based on the Internet layout, Rhino Smart Manufacturing is fully digitalized and intelligent, with each piece of fabric having an independent identity ID, enabling its production and processing process to be tracked along the entire chain, with intelligent AI machines making decisions and arrangements for pre-production scheduling, production scheduling and hanging routes. Driven by the innovative concept of "Enable on-demand fashion production", Rhino Smart can predict the overall trend and potential opportunities of industry development based on big data insight technology, and carry out global planning and intelligent optimization matching through a highly intelligent mobilization hub. We create flexible intelligent factories with data-driven material preparation and intelligent production line balancing, constantly iterating and upgrading the intelligent manufacturing system, realizing precise docking from the consumer side to the manufacturing side, customizing production to meet customers' individual needs, and forming the driving force of dissimilar intelligent manufacturing with micro-innovation (Figure 1).

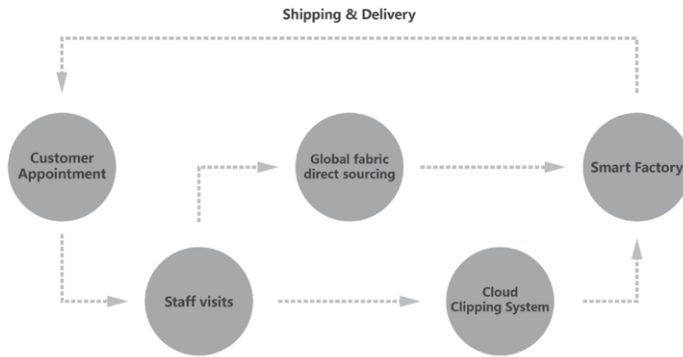


Figure 1. Transformation of the supply and marketing model under smart manufacturing.

3.2. Cross-border integration: design empowerment

In the process of reshaping the industrial ecology through digital intelligence, a large number of traditional manufacturing industries have spontaneously joined the Internet revolution, disrupting and regenerating themselves in a cross-border growth and fragmentation process. In the new digital economy represented by the "Internet+", handicrafts, traditional manufacturing industries, Internet companies and other innovative enterprises have joined the cross-border wave based on their own advantages, trying to break the traditional solidified existing business model and achieve a new round of industrial innovation and empowerment.

However, at the same time, revitalization is not only about material culture such as traditional handicrafts, but should encompass all rigid cultures, both material and non-material, and be broken in an environment where everything is connected. By breaking away from the original industry practices, we can maximize our creativity and realize the value of our brands by grafting on the values of other industries and transferring knowledge and methods from one discipline to another, which is the cross-border cooperation in the context of Design-smart to promote the revitalization of traditions (Figure 2).

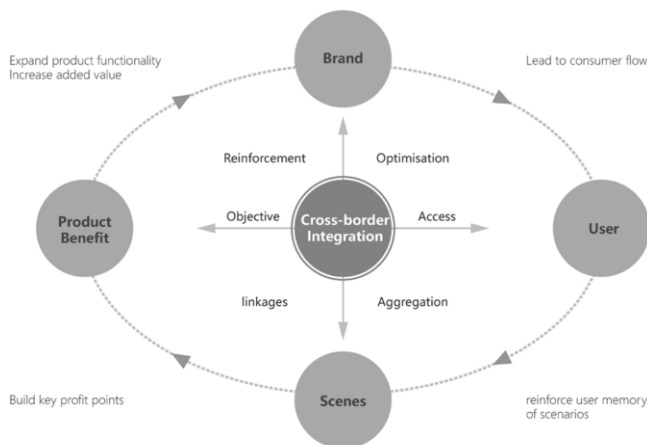


Figure 2. Cross-border element integration and linkages.

For example, the American e-commerce company ETSY sells originality and craftsmanship, bringing together a large number of creative craftspeople and talented designers who can create their own brands and sell their handmade products online, as well as participate in online and offline exchange parties to promote the development of craftsmanship. The value of Etsy to sellers can no longer be measured in monetary or commercial terms alone, but rather as a link to the community of craftspeople, a link that effectively bridges the gap between tradition and fashion, showing new possibilities for innovative forms of craftsmanship in the age of e-commerce.

3.3. Living Reinvention: Life Empowerment

The big data environment of the current information age has led to a change in the way of thinking in the industry. Due to the rapid updating of big data thinking formed by user behavioral habits, designers need to obtain real feedback from users in a timelier manner. By collecting a large amount of user experience data, we can dig out and analyze the problems of products in real time, adjust the defects in design and production, and improve the corresponding operation strategy and life service system.

In the context of the rise of popular culture and consumerism, and the trend towards aesthetics in everyday life, the aesthetic characteristics of flow and dynamism have led Design-smart to move towards a joint model of creativity, manufacturing, capital and operation, strengthening product design and development for lifestyle and conceptual service innovation, and increasing the integration with information and data to promote the link between design and creativity and the smart manufacturing industry. The deepening of the link between design and creative industries.

For example, the ceramic firing process began as an ancient Chinese art and craft technique, with its creator intended to exist as a functional vessel and ornamental object. With modern ceramic processing technology, various ceramic materials with different components have been widely integrated into the manufacturing industry in other fields of science and technology, enabling innovative applications of traditional technology across borders, such as the processing and production of smartphone housings. Compared to metal housings, new materials such as zircon ceramics and micro-crystalline zircon ceramics have a superior appearance and fine texture, and significantly improve the transmission quality of communications by virtue of their smaller electromagnetic shielding. The future of 5G communication using more than 3GHz wireless spectrum, communication band signal more complex, electromagnetic shielding performance requirements are higher, the advent of the 5G era will inevitably promote the popularity of ceramic cases, so Huawei, Xiaomi and many other mobile phone manufacturers are the first to use ceramic as the material of the flagship models, and in more series of products to promote the actual installation, the use of traditional technology cross-border activation to play a higher industrial efficiency.

4. Design-Smart Manufacturing Revitalization System

Design, as one of the typical signs of the external manifestation of cultural competence, is the key to the local industry's participation in the global economic arena. In this socioeconomic context, design intelligence that fully reflects local cultural development thinking is undoubtedly needed and advocated by industry and even the state. It is a more rational understanding of the relationship between following the

common norms of the cultural industry and pursuing individual qualities, and is a way of facing the cultural convergence under globalization with the power of industry.

The revitalization of traditions under the Design-smart system is therefore an efficient integration of resources and business models. The revitalization and innovation in the context of Design-smart is a multi-dimensional exploration of the connection between people and things, objects, fields and situations in an oriental perspective, with the integration of life, production and ecology as the key, emphasizing the integration of living wisdom, humanistic wisdom and technological intelligence, and building a virtuous cycle of cultural ecological chain and industrial value chain covering clothing, food, housing, transport, entertainment, use, appreciation and commerce. This is a top-level design strategy based on the "livelihood, industry and future" of culture, reshaping the structure of the cultural industry, cultural living space and cultural communication field, integrating human social networks, and leading the whole industrial chain of creativity, production, logistics, sales, services and research and development.

Traditional culture can be applied in a purposeful, targeted and flexible way by virtue of its own characteristics to other industrial resources that are apparently unrelated to it, using digital intelligence to create a "flexible supply chain", triggering a digital and inclusive ubiquitous connection of people, objects and organizations, and effectively giving rise to new modern lifestyles and business models. This will effectively give rise to new modern lifestyles and business models, thereby amplifying the value of mutual resources. This more intelligent and resilient digital integration industry model also provides the development of the cultural and creative manufacturing industry with the dynamic energy of industrial revitalization generated by technological innovation and digital transformation.

5. Conclusion

All tradition was once an invention, and all true inheritance is reinvention. Change is the eternal face of cultural survival. The rapid leap forward in science and technology has led to a constant renewal of people's understanding of the objective material world, and traditional culture has been given more of a spiritual relationship with the world of tomorrow by contemporary times, an aesthetics of everyday life through the bearing of design objects.

The revitalization of design in the context of Design-smart emphasizes the great changes in production, life and even life brought about by digital technology. It is also a design concept based on local culture, in line with the cultural spirit and design trends of the time, and the requirements of local cultural heritage and revitalization.

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