PROCEEDINGS ARTICLE

Reconstruction of Cognition and Experience: Value Innovation of Sustainable Design in Creative Industries

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ABSTRACT

The rave about sustainable design in design industries reveals a shift in design thinking, which forces the academy circle to reexamine the role and mission of design. The concept of sustainable design, however, is in its early stages of development, and scholars and practitioners do not appear to have reached a consensus on the concerns and issues to be addressed by sustainable design. This article discusses design creativity under technology-driven change and new opportunities for sustainable design in creative industries by reconstruction and reshaping the relationship between cognition and experience in design thinking.

1. INTRODUCTION

Current research on design methodology involves the systematic methodology of design process, including exploration of design decision mechanisms, design modeling improvement, representation, analysis, simulation, evaluation, and physical test techniques.

Sustainable design solutions have explicit codes in terms of economic, environmental, and social dimensions of value creation, that is, design process monitoring and research are used to learn design methods and cognition of design knowledge. Design innovation research lays the scientific foundation for designing products, accordingly for the research on sustainable design methods it needs to focus on design decisions, situations, and constraints, and to weigh the underlying cognition and logical mechanisms of multiple factors before integrating the theoretical knowledge and practice of design together.

2. MATERIALS AND METHODS

The empirical part of this study uses an inductive approach to create a theory-driven iterative process between the empirical and theoretical worlds, which systematically combines the empirical world, framework, theory, and cases. In this study, the business models provide the framework, and the concept of sustainability creates the theoretical foundation. In order to understand "sustainable" design, it requires an interdisciplinary approach to address environmental, economic, and social problems of the time. At present, sustainability research involves various disciplines, so that the importance of cross-disciplinary competence and expertise is widely recognized. The design of future is the convergence of multiple industry chains, as artistic creation itself develops with the advance and progress of artists' imagination. Designers also need to put efforts into research and practice on dynamic intersection of cutting-edge ideas across disciplines, industries, and technologies, using creating momentum to achieve and sustain creativity.

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2.1. Design Thinking: Reconstructing Cognition and Experience

The origin of "design thinking" comes from Peter Rowe's Design Thinking (1987), in which the term was first used to provide designers and urban planners with a systematic basis for practice problem-solving procedures. Design thinking is a methodology used to provide practical and creative solutions to problems or practices involve improvement in structure in the future [1].

Design thinking derives from the application of a host of methods and techniques from different disciplines, including engineering, informatics, and psychology. Today, the definition of design thinking is growing. In principle, design thinking is a combination of divergent thinking and integrated thinking, and focuses on the precise orientation of explicit and potential needs of customers and users. In terms of process from product prototype design to molding, design thinking is regarded as a micro-process includes ideas, prototypes, appearances, materials, and a macro-process includes user mindset, applicable people, and user psychology. Reconstructing design thinking, as an innovative approach, is not only applied to disciplinary education, especially interdisciplinary education in design, but also to the core part f corporate innovation. In the context of innovation and sustainability, design requires empirical reuse of cognition and experience. Finding and reusing methods of previous experiences is a crucial task.

The exploration and cognition processes that arise in the design process is regarded as an comprehensive ability, creative thinking highlights the cognition process of individual creation in terms of creating cognition, and generates and explores the unique characteristics related to design at the cognition level. Different foci such as process and product create complex structures in the discussion of creativity, and innovation process does not always produce innovative works in the real work. Given the different goals of creative characters and the influence of expert assessment, there is a wide gap between creativity of the process and the final product and relationships between them. Therefore, human creativity has different types at different levels. In addition, the connections between talent, insight, intuition, and ability beyond design skills remain uncertain. Accordingly, design creativity is a crucial

issue in design thinking. Creative thinking lays foundation for design thinking. In contrast to productivity thinking, individual creative design thinking regards design as a knowledge extraction process, while productive thinking is primarily concerned with manufacturing. In engineering design, creativity is achieved at early stage of original design, while the main production process is fixed because it is a repeatable manufacturing process. In the context of industrial design, with the development of technology management, opportunities for new ideas in the design process are increasing.

Training design thinking is to increasing search for new values, which is an intrinsic motivation to enhance creativity. Initially, design is a way of thinking, and design thinking referred to expert knowledge. But today, design is considered as a creative strategy formed in future society. Design thinking refers to a design process where designers think about problem solving and come up with creative solutions.

In terms of education, design thinking enhances creativity and innovation through interdisciplinary teamwork, combining engineering, business and other disciplines. For example, from an innovative perspective, interdisciplinary teams regard design thinking as an advanced educational model for creative practice. People focus the creation process through the thought of cognitive design process. For example, in the experimental case studies, clusters of concepts generated by designers are distributed in a design framework. Design was deemed as a problem-driven process that solved problems of conventional design thinking. It is of particular concern in industrial design, which constrains creativity in the framework of industrial society. Therefore, the construction of theoretical relationships in design thinking implies an improved construction of design-led human creativity (Fig. 1).
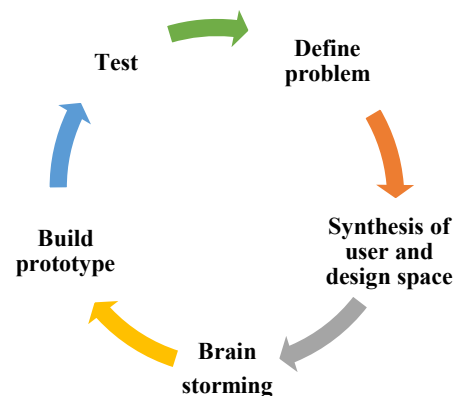

Figure 1. Flow chart of design thinking.

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2.2. Creative Industries: Underlying Opportunities of Knowledge Innovation Problems

Culture is a value-derived tool. In order to make the most of profits, it needs to create output with cultural value industrially. The term cultural industries originated in the post-war Frankfurt School for describing the standardized mass production of cultural goods, such as movies and television programs. Different subcultures formed a system which genealogizes dendrogram of art concepts. In this genealogical system, all industries can be considered as cultural industries, because the goods and services produced by them share the common cultural meanings and symbolic network. The core concerns of cultural industries are the symbolic, aesthetic, and artistic nature of output.

The shift from cultural to creative industries began in 1990, and creative industries were generated by the talents, skills and creativity of individuals who have the value of creating wealth and employment sources through creation and intellectual property, that is, "the creation, production, replication, distribution, and marketing of goods, services, and activities of cultural, artistic or heritage contents." The primary purpose of cultural and creative industries is the creation, production, replication, distribution, commercial activities and marketing of culture, art, cultural and artistic heritage. These industries create wealth and promote employment through creation and use of intellectual property. Cultural resources are goods, services, and activities that create value and are protected by intellectual property rights, including cultural attractions, local customs, languages, hobbies, visual arts, performing arts, design, festivals, music, theater and opera, television broadcasting, and advertising. These industries have replaced the coal, steel, and metal of industrial society as creative raw materials and value bases [2].

This means that besides the cultural connotation, the commercialization of culture also links cultural dissemination to economic consumption. The shift from cultural to creative industries implies that increasing intellectual creativity strengthen the national ability to adapt to the new dominant economic trends. This is the first approach to realize creativity in cultural industries, which emphasizes that the culture itself is abundant through literature review derived from culture.

Cultural and creative industries symbolize the inherent embodiment of human capacity to think, create, innovate and design economic value. Creative ideas involve culture and creativity. Creativity is an overused concept that is difficult to define or understand and is generally associated only with arts. In fact, creativity involves rethinking a problem or thinking about the origin of a problem. The ability to discover common threads in a seemingly chaotic and fragmented environment, to create original and to rewrite the rules is called creativity. Such a way of thinking encourages urban innovation and generates new possibilities.

The term of culture is abstruse, because "culture" is composed of multiple meanings. For example, the concept of "culture and development" in urban innovation, which interprets the relationship between cultural factors and urban development in terms of faiths, traditions and lifestyles, and how they interact with each other. Cultural and creative industries have a wide range from arts- or crafts-based companies or activities to technology-based companies, which may be capital-intensive or knowledge-intensive, whose products are symbolic of cultural features of these industries in all cases. The current literature on cultural and creative industries rarely mentions production scale or efficiency, but rather emphasizes the symbolic nature of products as a fundamental aspect of competitiveness. Some cultural and creative industries based on handicrafts or knowledge and capital intensity combine production efficiency with the symbolic nature of products. As Baudrillard argues, all products and services provided by industries have value in a particular cultural context, so that they are called cultural products. However, he supposes that everything is immersed and limited by culture, obscuring the fact that for some products, consumers are looking for their functional utility, while for others, their appeal to consumers lies in their symbolic meaning.

Creative industries are generated by talents, skills and individual creativity that they have value of creating wealth and employment sources through creativity and intellectual property. The primary purpose of entrepreneurial industries is the creation, production, replication, promotion, distribution, and marketing of goods, services, and activities of cultural, artistic or heritage contents. Research on design market evolves in the process of understanding customer behavior, product strategy, lifecycle engineering, customization, and globalization in the context of competitive pressures on product markets. Social factors are the driving force behind innovation activities, and subversive innovation environments always require a new climate of innovation.

In the world of culture and creative companies, the symbolic nature of products is more decisive than the organizational efficiency in its closest dimension of art, high culture and its most traditional dimension. Individual design products depend on the artist's sense of the symbolic nature of products, however, in the mass production of artworks, the efficiency and the mixed traits of design resources are imperative. In addition, mass products are essentially symbolic and competitive. The current economic and per capita income levels of society dictate that the cultural and symbolic nature of products and practicability is the trait that companies shall take into account as an important aspect of their competitiveness.

As an industry, cultural and creative activities are leading the economic growth of the state. The relationship between cultural and creative industries with economic production is secure. The highest income areas have the highest proportion of creative and cultural industries. This is a circular relationship that deserves our attention, which means that local prosperity will drive employment of cultural and creative industries and income growth.

The interaction between people and place requires designers' attention to sustainable design to minimize negative impacts on environment, while focusing on long-term economic development and respecting local culture. Recognizing that activities are and will be carried out within the limits of natural capacity to regenerate and produce natural resources. The economic impact of people and communities, traditions and modern lifestyles is inevitably relevant to sustainable design.

The interpretation of values in the information age requires a rethinking of the way people understand culture. In the context of global information economy, in a digital environment, the value of making the most of the value of ideas and creative expression means that the value of these forms cannot be obtained independently of design applications.

The knowledge innovation ecosystem of the 21st century is a multi-layer, multi-model, multi-node and multi-subject system. The system is composed of innovation networks, knowledge clusters, knowledge clusters, and knowledge meta-clusters [3]. These architectures also include formation, reform and decomposition in various institutional, political, technological, and socio-economic domains including government, universities, industries and NGOs, and involving information and communication technologies, biotechnology, advanced materials, nanotechnology, and new energy technologies.

2.3. Sustainable Design in the Era of Technology-Driven Change

Realizing sustainable consumption and production is one of the goals of the United Nations for sustainable development by 2030. How to make the society of sustainable development is one of the most challenging issues against mankind. Sustainable design is a strategic design activity that constructs and develops sustainable solutions, by weighing and considering economic, environmental, ethical and social issues, and guiding and satisfying consumer needs through design thinking to maintain the continuous satisfaction. The concept of sustainability encompasses not only environmental and resource sustainability, but also social and cultural sustainability [4]. In the concept of "sustainable" design, it is necessary to address environmental, economic, and social issues of the times with an interdisciplinary approach. Today, sustainability research involves various disciplines, so that the importance of interdisciplinary competence and expertise is widely recognized. The interdisciplinary application of designers and scientists gives design an excellent development opportunity.

Perception and conception of design knowledge have helped people to take in-depth understanding of design. Research on design anthropology focuses on the extraction of knowledge relevant to culture and the development methods of products with cultural diversity [5]. Design aesthetics focuses on human emotional responses to design-induced aesthetic impressions and endowing non-utility aesthetics by creating appearance and design through materialization and decoration [6]. Design engineering has made progress in knowledge building to optimize the communication between human and products and environment, especially in physical and information man-machine engineering.

Design technology research aims to identify technologies that address design problems, and sustainability is a multi-dimensional phenomenon that can be integrated into manufacturing in a variety of forms. Integrating sustainable design into mass production requires interactions between product design, manufacturing plants and design models. Products will be more competitive or "green" through development of new products and services or new business models by using new technologies. Hence, when analyzing sustainable design, people need to focus on technological solutions and business models. Sustainable design and manufacturing are linked to interactions between the economy, environment and society, such as designing green products and services can reduce environmental pollution, optimize use of natural resources and improve energy efficiency.

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For example, smart phones can support continuous data collection and real-time online data visualization, which is a low-cost, sustainable data mobile framework solution. With real-time cloud data updating, users can access information from the database without installing additional software on the computer. Sustainable data mobile framework sends data to the cloud on the Internet via an internally developed smart phone application, and enables real-time visualization of data from any device, mobile or desktop with any browser. The components of design remain the same: personnel, sensors, mobile devices, cloud storage and browsers, but the data framework of sustainable design provides a powerful online service that users can easily access and use real-time visualization of data applications via any device on the Internet. This is certainly a designed smart phone application, which can be applied to health community centers. In addition, machine learning and deep algorithms in artificial intelligence can be used as tools to analyze data, and technology-driven changes and the implementation of new ideas can achieve true sustainability for sustainable design.

3. CONCLUSION

In this article, the author summarized key issues of advanced design thinking: integrated solutions, domains outside framework, intrinsic motivation and resonance of social innovation for the future. From the perspective of creativity, higher order thinking is considered a special characteristic of advanced design thinking. Generation of higher order concepts can be understood as the driving force of design creativity. It implies an essential relationship between design and creativity, meaning "design-driven human creativity". In-depth understanding of this phenomenon is conductive to improving the completeness of human knowledge from the perspective of creativity.

Design is not fully automated. It combines automation and reality. The future of design will be a combination of automation and manual, and with the development of the world, people will live in an inclusive world, where the future of design will be inspired by our insights, that is, continuously searching and integrating resources to redefine and reinvent. At the same time, new technological applications and development provide new opportunities for the presentation of design. Subversive technological innovations increase new ways to perceive art for craftsmen, such as VR and AR, artificial intelligence,

additive manufacturing, and blockchain technology, can be used to protect intellectual property.

Business model innovation focuses on business models rather than products or processes, which is a complete concept of business mode innovation. Value creation is composed of new capabilities, technologies and processes, while concept innovation consists of new products, customers, markets, new channels and objective relationships. Creating value incorporates new income models and value cost structures.

The design of future is the convergence of multiple industry chains, as artistic creation itself develops with the advance and progress of artists' imagination. Designers also need to put efforts into research and practice on dynamic intersection of cutting-edge ideas across disciplines, industries, and technologies, using creating momentum to achieve and sustain creativity.

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