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Sustainable Design of Cultural Creative Products Based on Museum Cultural Derivatives

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Abstract. China's tourism industry has developed rapidly in recent years, but also promoted the rise of cultural and creative industries. However, due to the immature development of cultural and creative industries and inadequate market supervision, there are many deficiencies in cultural and creative products. At the same time, the quality of Museum souvenirs is uneven, and the utilization rate of resources is low. Given this phenomenon, the author puts forward the method of "PREACH March," and applies this method and sustainable design theory to the development of creative products in the Terracotta Warriors Museum. Taking the Terra Cotta Warriors and Horses Museum as an example, this paper analyses the defects of the existing souvenirs, refers to the design of the cultural creation products of the Palace Museum, redesigns the souvenirs of its museum sustainably, and solves the problem of how to make the museum souvenirs no longer be placed. "PREACH March" is applied to the design of the museum souvenirs of Terra Cotta Warriors and Horses, and a sustainable and recyclable bookmark is successfully designed. The purpose of this paper is to put forward a practical method for the design of cultural and creative products in the future, and to guide future design to follow the concept of sustainable development.

1. Introduction

1.1 Research Background

Chinese culture profoundly contains many precious treasures. In recent years, Chinese culture has caught worldwide attention, and gradually moved towards the world stage. No matter whether it was in the heritage art auction market, or the drawn films, it is gradually catching people's eye. From a product design view within the global competition market, the use of cultural features design application, not only improve the uniqueness of products, but also better provides an emotional consumer experience. It is evident in developed countries of the importance of highlighting the cultural and creative design innovations for a competitive advantage. In terms of cultural and creative industries mixed with the consumer process in modern culture, functional product development will gradually focus more on spiritual values (Chen, 2009).

Accompanied by the continuous improvement of people's living standards is that people's spiritual demand has been far exceeding their demand for food and clothing, which has triggered more concern and emphasis on culture, while the creative cultural products are also gradually known by the public. As an emerging industry in China, most of the products of the creative cultural industry are still demonstrating immaturity and incompleteness in spite of being immersed in thousands of years of cultural heritage and vast market.



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1.2 *Research Content and Scope*

This paper mainly consists of four parts. Elaboration on the topic from different aspects is carried out in the first three chapters, while the specific design practice is conducted in the fourth chapter, in which the sustainable concept and existing museum souvenirs are combined and applied. The research drew on the background of design for sustainable behavior, a relatively new field of inquiry concerned with reducing the social and environmental impacts of products during their use. Despite the increasing development of theories to change user behavior through design, there is a lack of understanding of how different cultural contexts affect behavior.(Spencer, J,2014).

1.3 *Research Purpose and Significance*

Museums have been defined by the International Association of Museums as non-profit organizations. The core connotation of such characterization definition is to emphasize the non-profit essential nature of cultural and exposition units, instead of prohibiting such institutions from obtaining certain economic returns through opening up services, providing multi-cultural products and establishing other business entities to effectively apply to make up for the shortage of operational funds. The development of museum undertakings will also be promoted by profits out of the research and development of multi-category duplicates, audio-visual products, knowledge reading materials, and other cultural products by focusing on the historical information and aesthetic value of cultural relics. The successful design of museum cultural derivatives will for sure promote the exchange between museums and people's cultural life at present, as well as attract more people's attention, visits and feelings to museums.

Therefore, this topic attempts to explore the development and design of museum cultural derivatives from the perspective of sustainable concept, with the view of constructing a sustainable recycling and utilization model of museum cultural derivatives.

1.4 *Research Methods*

Considering the unique cultural nature of museum cultural derivatives as well as their common aesthetics and commerciality with other cultural creative products, a set of "PREACH Methods" has been summarized in the research process of this paper, which shall be elaborated as follows:

The "PREACH method" includes six steps: "P", "R", "E", "A", "C" and "H", in which "P" stands for purport; "R" refers to "reside" for geographical location; "E" refers to "era" for age or time; "A" refers to "author" for author or person related to it, "C" refers to "culture" for cultural background; and "H" refers to "history" for the evolution of history. This method can be widely applied in design. The significance of design work should firstly be understood upon researching it, while the deep meaning of the work can be known through full investigation and understanding of its historical, social or cultural significance. The study of geographical location is mainly applicable to the architectural design, while product design does not require an in-depth understanding of the geographical location. At the same time, the era of the birth of this design work also has to be understood. As heroes are created by the times, so should design. Understanding the author of the work is conducive to the establishment of an understanding of design techniques and styles. Also, cultural background and historical development also play an essential role in design work. A complete understanding of a work can be achieved through the study of its significance, geographical location, era, author, cultural background and historical development.

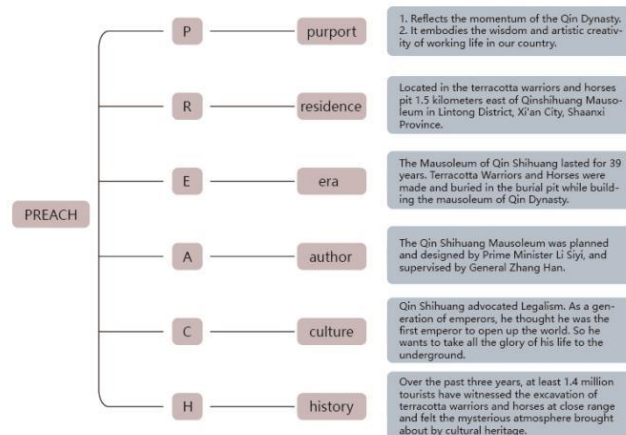


Fig. 1. The "PREACH method."

Other major research methods are as follows:

(1) Literature collection. Detailed study of the relevant content of this topic has been carried out and some literature materials have been sorted out and summarized by reading a large number of literature on domestic and foreign cultural creative products, museum cultural derivatives and sustainable design, so as to provides powerful arguments for the contention of this paper through the analysis of previous experience.

(2) Field research. The existing problems of cultural derivatives in Shaanxi Museum are summarized through the investigation of Shaanxi Museum in the early stage, to effectively promote the innovative redesign.

(3) Induction and deduction. The results of case analysis and field research are collated, summarized, analyzed and compared, to conclude the latter part of the paper.

(4) Design practice. The ideas presented in this paper are validated through the final innovative and redesign.

2. Research on the Current Situation of Museum Cultural Derivatives

2.1 Meaning and Categories of Museum Cultural Derivatives

Considered as powerful "messengers of meaning," tourist souvenirs help consumers to maintain material links with cherished past experiences and to convey individual and cultural meanings to their broader existence. (Alain, D. and Julie, M.,2014)Cultural assets cover a wide scope. It can be summarized into two areas: tangible cultural and intangible cultural. The first part includes historic buildings, natural landscape, cultural landscape, floral, fauna, regional life objects, etc. The second part includes things such as Tang poetry, Sung lyrics, classical literature, religions, customs, festivals, ritual, and behaviors. Lee (1996) considers culture as referring to "products of human activities, including tools, social life used to maintain the laws and institutions that depend on spiritual life all the art products, but also includes many the human activity history in the creation process." Highlighting the presence of the cultural characteristics, from the design side, the elements of national culture, such as symbols, lines, stories, shapes, and colors help to explore the product design and give information. Therefore, the consumers, in addition to the actual use of its functionality, can sense the designer through the commodity characteristics through desired shapes conveying the culture, to create a moving and common of emotional interaction(Chang, C.2015).

Compared with museum cultural products as a broad concept category, museum cultural derivatives are considered as a narrow concept category, while cultural derivatives belong to one of the various categories of museum cultural products. Cultural derivatives are an industry that plays a crucial role in the development of museums. Unlike ordinary souvenirs, cultural derivatives are

usually designed based on the tenet of museums, the concept of museums and the elements of exhibits. In spite of assuming the same function as souvenirs, they demonstrate a quite different nature from the pure commercialization of souvenirs and are more like artistic commodities due to the addition of cultural symbols and connotations. Museum cultural products in the popular sense refer to the unique cultural and memorial commodities related to the collection (or exhibition) of the museum which are displayed in the museum stores and the cultural and commemorative special commodities related to the cultural characteristics of the museums, which is regarded as a crucial part of the museum cultural industry and carries historical and cultural information related to the theme of the museum, while certain cultural connotations, local characteristics and artistic tastes are also endowed.

2.2 Commercial Model of Museum Cultural Derivatives

By the survey, the development of foreign museum stores has been far more developed than that of domestic museum stores. Standard museum stores are set up by most museums abroad, while except for the self-owned museum stores within the store, the corresponding shops online are also widely established on the Internet. In Singapore and the United States, for example, shopping platforms consisting of several different museum stores have even been constructed. Regardless of the size of stores or the degree of souvenir development, most foreign museum stores have been on the right track and demonstrating favorable operating conditions. In spite that several museums in China have also set up "Service Department," "Commodity Department" or "Cultural Relics Store," they are mostly engaged in small tourist commodities as well as food and beverages. Essentially, they can only be regarded as "snack stores" in terms of both interior decoration and products they are engaged, rather than museum stores in the real sense. Also, their operation is generally unsatisfactory. Except a few large museum stores (such as the Shanghai Museum and the Capital Museum which attract more visitors), most of the museum stores are in poor business. Some museum stores have not even been entered by even one visitor during the period of my observation because of their remote location and inadequate visible signs, which is in sharp contrast to a large number of visitors to the museums.

2.3 Existing Problems of Museum Cultural Derivatives

Tourist souvenirs are a typical example of special possessions that may convey deep meanings to tourists' lives (Alain, D. and Julie, M., 2017). Despite that the academic research results of museums are undeniable as the academic research institutions, they can only introduce local tourist souvenirs as substitutes due to the development of derivative souvenirs with the characteristics of the museum has encountered greater difficulties. Some tourist souvenirs are currently sold in museum stores, which present serious homogeneity. Although they may be attractive to foreign tourists who are new to China, it is ineffective for "knowledgeable" domestic tourists, which means that a huge market has been abandoned. By comparing the development of museum cultural products at home and abroad, it can be found that the development of derivatives in China's museum cultural products is rare, while they are mostly not innovative and assume a low level of design even if there are derivatives, such as simply adding the name or logo of the museum. Given that most of the existing museum cultural products in China are low-end products wholesaled from the small commodity market, they demonstrate rough appearance and poor quality, which not only fail to stimulate the purchase willingness of tourists, but also result in the impact of the national image to a certain extent.

3. Research on the sustainable design concept of cultural and creative products based on museum cultural derivatives

3.1 Definition of a sustainable design concept

The design is the process of understanding the world and articulating an alternative conception of how it should be shaped, according to the designer's intentions. Through design, we cause change and shape our environment. If we don't take sustainability into account when designing, no matter in which domain and for what purpose, we miss the opportunity to cause positive change. We recognize

that there is a rapidly increasing awareness of the fundamental need and desire for a more sustainable world, and a lot of genuine desire and goodwill - but this alone can be ineffective unless we come to understand that: There is a narrow perception of sustainability that frames it as protecting the environment or being able to maintain a business activity. Whereas as a systemic property, sustainability does not apply simply to the system we are designing, but most importantly to the environmental, economic, individual, technical and social contexts of that system, and the relationships between them(Becker, C et al.,2014).

From the concepts universally recognized in the world, we can sort out the rich connotation of sustainable development in the following aspects:

The earth is a complex giant system. Every country or region is an inseparable subsystem of the giant system. The most fundamental characteristic of the system is its integrity. Every subsystem interacts with other subsystems. As long as one system has problems, it will directly or indirectly affect the disorder of other systems, and even induce the overall mutation of the system, which is most prominent in the Earth's ecosystem. Therefore, sustainable development pursues overall development and coordinated development, that is, common development. The coordinated development includes the overall coordination of the three systems of economy, society and environment, the coordination of the world, the country and the region at three spatial levels, and the coordination of the economy and the population, resources, environment, society and all levels within a country or region. The sustainable development originates from the coordinated development.

3.2 The development of a sustainable design concept

Earlier, the concept of sustainability was first proposed by ecologists, which is called ecological sustainability. It aims to illustrate the balance between natural resources and their exploitation and utilization. In November 1991, the International Ecology Association (Intecol) and the International Federation of Biological Sciences (Cubs) jointly held a symposium on Sustainable development. The outcome of the seminar not only develops but also deepens the natural attributes of the concept of sustainable development, which is defined as protecting and strengthening the production and renewal capacity of environmental systems. Defining sustainable development from the concept of the biosphere is a representative of defining sustainable development from the aspect of natural attributes. That is to say; sustainable development is to seek the best ecosystem to support the ecological integrity and the realization of human aspirations, to make the human living environment sustainable. Culture creativity is a new factor for economic development; a country's development is not only dependent on its scientific and technological capability anymore, but on the ability to create local culture, lifestyle and taste and to add value with a combination of art, and business. Furthermore, in the era of an aesthetic economy, a product must possess charm, beauty and an emotional and pleasant element to stand out from the other competitors on the market(Chi-Hsien and Wang, C.,2015).

3.3 The application of the concept of sustainable design in cultural derivatives of museums

The application of the concept of sustainable development in creative products can be considered from the following aspects:

1. Environmental perspective. Tourist souvenirs should be strictly controlled in production to reduce environmental pollution and waste of materials. Also, in the process of transportation, environmental resources should also be saved, and souvenirs should be transported to museums in the most environmentally friendly way.

2. Practical angle. After purchasing souvenirs home, tourists should repeatedly use souvenirs to give full play to the value of products. If only as a handicraft placed at home as an appreciation, it loses the significance of sustainable development.

3. Economic Perspective. Tourism souvenirs in line with the concept of sustainable development should be recyclable. After buying the product home, tourists can not only use it for themselves, but also give it as a gift to others. When the product is used many times, it can still play its final value, that is, recycle it. Such souvenirs truly carry out the concept of sustainable development.

3.4 *The significance of sustainable design concept*

Sustainable development first advocates maintaining the progress and development of human society from the perspective of environmental protection. It calls on people to pay attention to the protection and improvement of the ecological environment while increasing production. As soon as the term "sustainable development" was put forward, it gradually gained recognition in the world and became one of the most frequently used words in mass media. This reflects the suspicion and abandonment of the development path that mankind has gone through before, and also reflects the longing and yearning for the development path and goal that mankind has chosen in the future (although there are still some ambiguities). It is gradually recognized that the path of development in the past is unsustainable, or at least unsustainable, and therefore undesirable. The only alternative is sustainable development. This reflection of human beings is profound, and the conclusions drawn from this reflection have epoch-making significance. This is the fundamental reason why the idea of sustainable development has gained consensus and universal recognition in countries with different economic levels and cultural backgrounds all over the world. Sustainable development is a goal that both developing and developed countries can strive to achieve. The vast majority of developing countries are actively engaged in the practice of sustainable development, which is also an important reason why the theory of sustainable development is popular all over the world.

4. **Research on the sustainable design method of cultural and creative products based on museum cultural derivatives**

4.1 *Material selection for sustainable design*

In the process of material extraction, preparation, production, use and waste, a large number of resources and energy are often consumed, and a large number of pollutants are discharged, resulting in environmental pollution, so the selection of recyclable materials should be worthy of attention by designers. When selecting materials, the following conditions shall be met:

(1) Energy saving: materials can reduce the energy consumption of a system. Through better performance to improve energy efficiency, that is to say, improve the material performance can reduce energy consumption, to achieve the purpose of energy saving.

(2) No pollution: the materials used shall be easy to process and free from pollution or minimum pollution during processing. Also, the selection of material types should be less the better in-depth analysis of the material processing process, the choice of easy processing and processing without pollution or less pollution material is to ensure the sustainability of the product requirements, reduce, control the manufacturing process pollution guarantee. That is to say; material selection should make products produce the least waste in the manufacturing process, and the least environmental pollution.

(3) Ease of disassembly and reuse: This is from of easy disposal of discarded products. At present, the disposal of waste commodities in the world has attracted more and more attention. Sustainable design can prevent the depletion of the earth's resources and effectively protect the environment. Easy recycling is crucial to the recovery of products.

4.2 *Sustainable Design of Processing Technology*

Sustainable design of processing technology can be considered from two aspects: the process of the product itself and the packaging process of the product. In the production process of products, the processing technology with lower cost and fewer consumables should be used. In packaging, the utilization and recovery of paper and the use of ink in the printing process should be taken into account.

4.3 *Sustainability Design of Usage Mode*

Most of the existing cultural derivatives are ornamental crafts or souvenirs. After purchasing, tourists either leave them at home or give them as gifts to others. However, whether placed at home or given to others, the end of the product is ashes or even thrown into the garbage can, no one cares about it.

Therefore, the use of creative products should play as many different roles as possible, rather than just as an ornamental. For example, in the cultural derivatives of the Palace Museum, there are many usable items, such as pillows, chopsticks, earphones and so on.

4.4 Sustainability Design of Business Model

Zukin (1995) emphasized that culture is not only capable for propelling the industries in terms of the economic aspect, but can also be used as the basis of the economy, providing product concepts for an entire line of products; the relationship between culture and economy has transformed from traditionally contradictory to mutually beneficial. Lash Urry (1994) had the same idea, indicating that a mutual beneficial relationship exists between culture and the economy; culture is presented as merchandise because of the economy, and economy is enhanced through culture in terms of beautification and embedded connotation, and elevates life quality and cultural recognition (Liang and Zhang 1995). Product design plays the role of cultural messenger in cultural economy, delivering cultural messages to the consumers through symbolic cultural codes and semantic con-version, such cultural merchandise also allows the consumers to foster affection toward local culture and boosts the value of culture (Chen, C., 2016). So the sustainability of the business model is particularly important.

5. Practical Application of Sustainable Design Method in Creative Products

5.1 Example analysis—the palace museum

The Palace Museum, as the representative of Chinese museums, has achieved great success in its creative products because it has found a way to develop creative products that conform to its characteristics. The design, production, and sale of creative products in the Palace Museum are based on the deep excavation of cultural connotations. Every process permeates the advanced concepts and painstaking efforts of the Palace Museum. Out. The development of creative products in the Palace Museum is far ahead of other domestic museums, but we must still maintain a serious attitude, keep pace with the times, innovate constantly, and achieve quality, quantity and sustainable long-term development in every link of research and development, production and sales.

5.2 Market Research on Tourist Souvenirs of Terracotta Warriors and Horses of Qin Shihuang

Shaanxi's tourism industry has developed rapidly in recent years. Terracotta Warriors and Horses, as one of the popular scenic spots in Xi'an, are very popular with tourists. Despite the increasingly perfect tourism industry, there are still many shortcomings in cultural derivatives. The author visited some merchants selling around the terracotta warriors and horses, and found that the existing cultural derivatives are mainly small copper alloy ornaments shaped by terracotta warriors and horses, followed by bookmarks, key chains and imitation bells. These derivatives are scarce in variety, single in form and lack of innovation. Also, in the processing technology, the quality of these derivatives is uneven, rough workmanship, there is no uniform price, and the market is chaotic.



Fig. 2. Existing terracotta museum tourist souvenirs.

5.3 *Practical Application of Design Method for Tourist Souvenirs of Terracotta Warriors and Horses of Qin Shihuang*

Tourist souvenirs not only reflect the local government's emphasis on culture, but also reflect the country's protection and respect for history. Therefore, by increasing the connotation of cultural derivatives to reflect the culture of the Qin Shihuang period, to improve national cohesion and national pride. To meet the concept of sustainable development, the impact of resources and environment in the production process is offset by increasing the use of products. For tourist souvenirs, the main purpose is to increase the types of practical tourist souvenirs, so that tourists can use the souvenirs to offset the impact of the production and transportation of the souvenirs, to achieve sustainable purposes.

Example: Bookmarks

After Qin Shihuang unified China, Xiaozhuan carried out the policy of "book with text, car with a track" and unified measurement and weights. It was under the responsibility of Prime Minister Li Si. Based on the original seal script used in Qin State, Xiaozhuan simplified, canceled the other six languages and created a unified writing form of Chinese characters. It was popular in China until the end of the Western Han Dynasty (about 8 A.D.) before it was gradually replaced by Li Shu. But because of its beautiful font, it has always been favored by calligraphers. Because of its complex strokes and ancient forms, and can add twists and turns at will, seal engraving, especially the need for anti-counterfeiting official seals, has been using seal books. The copper alloy is selected from the material, which has good chemical properties and corrosion resistance, is not easy to be damaged and has a long service cycle. The combination of a small seal and a bookmark not only enables the buyer to reuse the script, which is in line with the sustainable design, but also enables the visitor to have a deeper understanding of the qin culture.



Fig. 3. Bookmark design.

6. summary

This paper summarizes the examples of cultural derivatives of Xi'an Terracotta Warriors and Horses Museum, and tries to apply them to other museums.

This paper mainly discusses the cultural and creative products based on the cultural derivatives of the Terracotta Warriors and Horses Museum in Xi'an. For other museums which may have different situations with the Terracotta Warriors and Horses, it can only be used as a case reference. Also, our on-site interviews and tests at the Terracotta Warriors and Horses Museum are limited, and the results do not represent the situation of all visitors to the Terracotta Warriors and Horses Museum. The concept of sustainable design is still in its infancy in our country. Enterprises don't have a deep understanding of sustainability. However, in such circumstances, the souvenir market has less awareness of sustainability. It is hoped that the design of cultural derivatives will be of inspiration to other museums in the future. In the new era, the public's demand for material and spiritual consumption has become more and more intense. The purpose of visitors visiting museums is no longer limited to the view of exhibits and exhibitions. People's demand for consumption is derived from the preservation of museum visits and memories. As an important value-added component of Museum Cultural system, creative cultural products have the functions of disseminating culture, enhancing cultural confidence and classics. The important role of inheritance is similar to that of museums, which use their excellent cultural essence to gather advantages and make cultural

innovations applied to the extension and expansion of museum functions, and provide better service for people with "sustainable design." While creating sales revenue, it also plays an important role in propaganda, inheritance, and promotion of traditional culture and Museum image, thus forming a virtuous circle for the whole development system of cultural and creative products(Ge, J et al.2018).

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