

Literature Review on the Application of Hongshan Cultural Patterns in Cultural and Creative Products

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ABSTRACT

This paper presents a systematic literature review on the application of Hongshan cultural patterns in cultural and creative product design, addressing the lack of comprehensive research on their integration into modern design practices. Despite the historical and artistic significance of Hongshan culture in Northeast China, its visual patterns have not been extensively studied or effectively utilized in contemporary creative industries. This study aims to bridge this gap by critically examining existing research on Hongshan pottery patterns, exploring their role in cultural inheritance and innovation, and analyzing their potential applications in product design. A structured literature search was conducted using academic databases, including Web of Science, Scopus, CNKI, and Google Scholar. Keywords such as "Hongshan culture," "pottery patterns," "cultural creative design," and "heritage innovation" were used to identify relevant studies. Studies lacking empirical analysis or theoretical contributions were excluded to ensure a focused and high-quality review. The findings of this review provide a theoretical foundation for understanding the aesthetic and symbolic characteristics of Hongshan pottery patterns and their application in various cultural and creative products, including daily necessities, stationery, and clothing. Additionally, this study identifies key challenges and opportunities in integrating traditional cultural elements into modern design, offering valuable insights for both researchers and designers. By summarizing existing research and highlighting future directions, this review contributes to a deeper understanding of the intersection between traditional cultural heritage and contemporary creative industries.

Keywords: Hongshan Culture, Pottery Pattern, Cultural and Creative Product Design



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1 INTRODUCTION

In this research, the research on Hongshan culture, Hongshan pottery patterns, and the design and application of cultural and creative products are reviewed. First, the historical and cultural background of Hongshan culture, including its importance and influence in northeast China and research findings, are explored. Secondly, the concept of the Hongshan pottery pattern, related findings result, and its role in cultural inheritance and innovation are explained. Finally, the concept of cultural creative product design, related research results, and application in different fields are discussed. The research paves the way for the detailed elaboration on the topic in the following research.

The theoretical foundation of this research is based on two primary theories: Cultural Heritage Theory, Design Innovation Theory. These theories provide the conceptual basis for analysing the

integration of Hongshan pottery patterns into cultural and creative product design. Cultural Heritage Theory emphasizes the preservation, inheritance, and transformation of historical cultural elements (Choay, 2001). Hongshan pottery patterns, as an important part of China's prehistoric cultural heritage, embody rich aesthetic values and symbolic meanings. Applying this theory, this research explores how Hongshan pottery patterns can be adapted and revitalized in modern cultural and creative product design while maintaining their original cultural significance. Design Innovation Theory explains how traditional cultural elements can be reinterpreted and applied in contemporary contexts through innovative design methods (Brown, 2009). This research follows the principles of design innovation to integrate Hongshan pottery patterns into products that align with modern lifestyles. By utilizing advanced manufacturing techniques and creative design approaches, traditional Hongshan motifs can be transformed into visually appealing and commercially viable cultural and creative products.

2 METHODOLOGY

This research employs the literature review method to systematically collect, analyze, and synthesize existing scholarly materials related to Hongshan culture, Hongshan pottery patterns, and cultural creative product design. The literature review method is chosen because it allows for a comprehensive understanding of previous studies, helps identify research gaps, and provides a theoretical foundation for further exploration.

The literature review method is suitable for this study as it enables an in-depth examination of historical and contemporary research on Hongshan culture and its application in design. Since Hongshan culture is an archaeological and cultural heritage topic, much of the existing knowledge is derived from previous archaeological reports, academic papers, and cultural studies. Additionally, the design and application of cultural and creative products are multidisciplinary topics, requiring an extensive review of diverse sources to synthesize insights from cultural heritage studies, design theory, and consumer research.

To ensure a comprehensive and systematic literature collection, the following search strategies were employed: First, the research primarily utilizes CNKI, Web of Science, Google Scholar, Scopus, and ProQuest to collect academic papers, journal articles, books, doctoral theses, and conference proceedings. Second, the keywords used in English and Chinese include “Hongshan culture,” “Hongshan pottery patterns,” “cultural heritage design,” “traditional patterns in creative industries,” and “cultural creative product design”. Third, the selection of literature focuses on sources published in peer-reviewed journals, academic books, and credible reports, covering studies from archaeology, design, cultural heritage, and creative industries. Priority is given to research published within the last 20 years, while foundational and highly cited historical studies are also included. Fourth, studies that directly examine Hongshan culture, pottery patterns, cultural heritage preservation, or their application in product design are included. Studies not relevant to Hongshan culture or lacking academic credibility are excluded.

To ensure the reliability and relevance of the selected literature, the following evaluation criteria were applied: Author Credibility: The background, academic qualifications, and institutional affiliations of the authors are assessed. Research Methodology: Preference is given to studies employing rigorous research methods, such as archaeological analysis, ethnographic studies, case studies, and empirical research. Data Sources: Studies based on primary archaeological data, historical records, and expert interviews are considered more credible. Research Findings: The study evaluates whether the findings contribute to a deeper understanding of Hongshan culture, its patterns, or their applications in design. Publication Source: Literature published in high-impact journals, university presses, and recognized academic institutions is prioritized.

Once the literature is collected and evaluated, a systematic thematic analysis is conducted to categorize and synthesize the information. The data analysis process consists of: The literature is categorized into key themes, such as Hongshan cultural heritage, pottery pattern aesthetics, cultural

inheritance, and creative product applications. The findings from different studies are compared to identify common themes, contradictions, and research gaps. The evolution of Hongshan pottery pattern applications in cultural and creative industries is examined to understand emerging trends and innovative design approaches. The research synthesizes key insights from the literature to construct a coherent framework for integrating Hongshan pottery patterns into modern cultural and creative product design.

Despite the rigorous methodology, this research acknowledges several limitations and potential biases: The literature review primarily includes Chinese and English sources, which may result in the exclusion of relevant studies in other languages. The study focuses on published academic research, potentially overlooking unpublished field reports, industry white papers, or lesser-known sources that could provide additional insights. The available literature on Hongshan culture relies heavily on archaeological findings, which may have interpretative uncertainties due to the limited material remains and evolving research perspectives. Since this research focuses on design applications, studies emphasizing purely archaeological or anthropological aspects without direct relevance to design may not be included in depth. By recognizing these limitations, this study encourages further interdisciplinary research to address the gaps and expand the understanding of Hongshan pottery patterns in contemporary design.

3 LITERATURE REVIEW

3.1 Hongshan Culture

The Hongshan culture is centred on Chifeng. From the perspective of the density of distribution and the typicality of cultural characteristics, the main distribution area of Hongshan culture is located between the middle and upper reaches of the Laha River and the Daling River. Key cultural relics include Xinglongwa, Zhaobaogou, Fuhe, Xiaoheyan, and Hongshan cultures. Since these cultures belong to the same lineage, the late archaeologist Mr Su Bingqi referred to them as "Hongshan cultures". Hongshan culture is very important in academic circles and has become a prominent field of academic research. Its unique geographical environment and numerous excavation sites, such as the Niuhe beam sites in Western Liaoning, are renowned for their religious artefacts, including jade objects, various pottery, and stone tools. Notable finds include statues, temples, burial sites, and altars. It has become the focus of the discussion on the origin and the direct root system of Chinese civilisation, attracting worldwide attention. The study of Hongshan culture is becoming more prominent, supplementing the exploration of the origin of Chinese civilisation.

The earliest archaeological survey in Chifeng was conducted by a Japanese doctor, Ryozo Torii, who spent most of his time there for a period of three years starting in 1906. In 1914, Toju Longzang published the article, *Primitive Inhabitants of Eastern Mongolia*, which conveyed to the world information on the ancient civilisation of Chifeng land for the first time, followed by scholars from the East and the West (Huaxing, 2018). From 1922 to 1924, Sang Zhihua and De Rijin conducted several investigations in the Chifeng area and discovered more than 20 Neolithic sites, including the Hongshan Site Group (Jin, 2019).

In 1930, Mr Liang Siyong investigated the Yingjin River Basin and Linxi area of Chifeng. Mr Liang realised the prehistoric cultural differences between the north and the south of the West Liaohe River basin and believed it should be a special research topic. This excavation was the first time Chinese scholars undertook field archaeological work in the Chifeng area (Yu, 2013). In 1935, Toshiaki Hamada and Kiyochi Mizuno, from the Archaeological Society of East Asia in Japan, excavated the first and second residential areas of the Hongshanback site in Chifeng. They obtained a batch of important physical specimens of Hongshan culture (Zheng, 2020).

In 1954, Mr Yin Da officially suggested the name "Hongshan Culture" for the first time, emphasising that Hongshan culture is of great inspiration. He also studied the relationship between the

cultural remains of the Neolithic age in the north and south of the Great Wall (Xu, 2004). In 1956, lecturers and students of archaeology at Peking University conducted an investigation and trial excavation of three sites in front of Hongshan Mountain and one behind it (Lu, 1958). They obtained a batch of important physical specimens, which contributed to the improvement of the overall understanding of the Hongshan cultural sites group and the study of Hongshan culture. In 1971, a c-shaped jade dragon from the Hongshan culture was discovered at the Saiqintala site in the Wengniut Banner. In 1973, a sarcophagus tomb from Hongshan culture was discovered at the Hutougou site in Fuxin (Fang & Liu, 1984), and 18 pieces of jade articles were unearthed. Numerous jade articles on Hongshan culture were found during this search. With the accumulation of artefacts, the connotation of Hongshan culture is constantly enriched, presenting distinct regional and era styles. Hongshan culture, as a Neolithic archaeological culture in western Liaoning Province and its relationship with Yangshao culture in central China, has attracted significant attention among academic circles.

From the late 1970s to the late 1980s, a series of major breakthroughs were made in the archaeological discovery and research of Hongshan culture. The excavation of the Dongshanzui site in Kazuo, Liaoning Province, for the first time, revealed the shape and structure of the altar of Hongshan culture. The discovery and excavation of the Niu He ruins group at the junction of Ling Yuan and Jianping counties (Archaeological Institute of Liaoning Province, 2005) revealed the largest known worship site of the late Hongshan culture. The excavation also unearthed sarcophagus tombs at multiple locations, containing Hongshan culture jade with clear stratigraphic relationships, confirming the existence of a Hongshan culture jade carving group. At the same time, related relics such as temples for female deities, altars, and large sacrificial platforms were found. These are among the most significant archaeological discoveries in China in the 1980s.

In the Aohan Xitai site (Yang & Lin, 2011), it was found that two trenches were connected to form a "protruded" shape, surrounded by houses and caves. This discovery represents a significant find in the archaeology of Hongshan cultural settlement. Nasitai site (Dong & Han, 1987), with a total area of 1.5 million square meters, is the largest known Hongshan culture settlement site in the north of Xilamulun River. More than 80 pieces of articles on Hongshan culture jade have been collected from this site, providing evidence to understand the regional characteristics of Hongshan culture. In the late 1980s, the comprehensive study of Hongshan cultural jade entered a new stage, establishing the significance of Hongshan cultural jade in the history of Chinese prehistoric jade development. During this period, Aohan Banner's cultural relics survey led to the discovery of 500 Hongshan cultural sites of different sizes. More importantly, through field archaeological excavations, the Xinglongwa and Zhaobaogou cultures were confirmed, revealing them as the ancestral origin of the Hongshan culture in this region.

In the 21st century, a series of new achievements have been made in the study of Hongshan culture and civilisation in western Liaoning. From 2001 to 2003, the excavation of the second site, the Aohan Xinglonggou Site (Inner Mongolia No. 1 Team of Institute of Archaeology, Chinese Academy of Social Sciences, 2004), revealed a rectangular Huan-trench settlement from Hongshan culture dating 5,300-5000 years ago. This discovery narrowed the existing gap in the research data on the Hongshan cultural site. Complete pottery figures from the late Hongshan culture were unearthed. Such discovery is extremely rare among archaeological relics from the same period in China and serves as important evidence for ancestor worship during the Hongshan culture period.

The Wei Jia Wopu site (Duan et al., 2011) is the largest settlement site in the Hongshan culture that has been formally excavated to date. A total of 103 houses in the middle and early stages of Hongshan culture have been cleared, revealing the layout of the settlement. Since 2004, in order to meet the needs of national development, including comprehensive investigations and improvements to geographical, cultural, and other foundational aspects, the Inner Mongolia Institute of Cultural Relics and Archaeology has carried out investigations and excavations at the Zhangfangchuan, Erdaowupu, Laoniuanggou, and Halahaigou sites (Institute of Cultural Relics and Archaeology of Inner Mongolia Autonomous Region, 2013). The findings have greatly enriched the relevant data for the study of Hongshan cultural settlements. The excavation of the Hamin Mengha prehistoric settlement site (Ji &

Zhu, 2012) unearthed a large number of relics, providing rare materials for the study and enrichment of the cultural connotation of Hongsha. The findings are greatly significant in restoring the original appearance of prehistoric human life and the study of ancient jade culture. In terms of the study of civilisation in western Liaoning, the second and third phases of the Chinese Civilisation Exploration Project have been formally implemented in the region.

In the stated study, a systematic investigation was undertaken on the Hongshan cultural sites in the upper reaches of the Jiaolaihe and Mangniu Rivers. For the first time, a comprehensive and systematic study of the jade carving technology of Hongshan culture was undertaken. The Sino-American joint archaeological team made important achievements and discoveries in archaeological investigations in the upper reaches of the Daling River. Since 2011, the official publication of *Niuheliang - Excavation Report of Hongshan Cultural Site (1983-2003)* (Luan, 2015) marks a new stage in the study of Hongshan culture, which is a milestone significant in the history of discovery and research of the culture.

3.2 Pottery Patterns of Hongshan Culture

Hongshan culture has a rich and profound history. With unique aesthetic features and high artistic value, the Hongshan pottery pattern boasts an important position in the history of Chinese civilisation. The aesthetic study of Hongshan pottery patterns provides theoretical references to ancient history. Besides, it also provides practical references for the formation of modern aesthetics and modern art design. Thus, the culture has strong theoretical and practical significance.

The pattern of Hongshan painted pottery, which was created by Hongshan ancestors in the Neolithic Age, reflects the crystallisation of beauty in achieving high unity of material and spirit. In the aesthetic field, it is a unique artistic phenomenon. The pattern of Hongshan-painted pottery is an important research area for scholars. The classification and characteristics of the patterns are regarded differently by Chinese and foreign scholars. The earliest reference to Hongshan painted pottery can be found in Liang Siyong's *Archaeological Essays* (Liang, 1959). Mr Su Bingqi's works, *The New Origin of Chinese Civilisation* (Su, 2019) and *Chinese Archaeological Roots: A Chinese Descendant of the Dragon* (Su, 1994), along with Guo Dashun's book on the research on Hongshan culture (Guo, 2005), provide valuable insights. Both Su Bingqi and Guo Dashun have studied Hongshan culture pottery from archaeological and historical perspectives. Guo Dashun offered the first in-depth explanation of the discovery and research of Hongshan culture.

In Guo Dashun's book, the discussion on the Hongshan culture starts by analysing the relics discovered at its important sites, which comprises the culture's stages of evolution, primitive religious beliefs, jade and pottery, tombs, settlements, and culture. Subsequently, it analyses the status of Hongshan civilisation and its relationship with the origin of civilisation. It only summarised the types and use of pottery in each period of Hongshan culture but failed to highlight their patterns.

In Zhang Mingchuan's *Atlas of Chinese Painted Pottery*, the author researched the pattern of Hongshan culture pottery from the aspect of types and distribution. He believed that the pattern of the Hongshan cultural painted pottery was meticulous, and the people were talented at using oblique lines and arcs due to the presence of patterns with curved changes and hookback echoes. Often composed of different patterns, pattern bands are arranged in multiple layers in the upper belly of the pottery with repeated patterns to ensure that the decorative effect is enhanced and unique (Zhang, 2005).

The aesthetic connotation of patterns from the perspective of totemic historical materials and religion was studied by Lu Sixian in his article 'A Study of Patterns on Painted Pottery in Xiajiadian Lower Culture' (Lu, 2002). The typical patterns of Hongshan-painted pottery patterns were classified and summarised in Zhao Yongxin's research on the 'Application of Hongshan Painted Pottery Patterns in Mongolian Furniture Decoration Design'. The study innovatively summarises, abstracts, simplifies, breaks down, and reconstructs the patterns of Hongshan painted pottery patterns and exaggerates and

beautifies them (Zhao, 2013). Exaggerated beautification is an artistic technique of pattern design which makes some typical patterns more distinctive and beautiful through exaggerated design and expression.

In order to facilitate aesthetic research, the aesthetic value of the decorated pottery from Hongshan culture was elaborated in Bai Yalike's 'The Aesthetic Study of the Decorated Pottery of Hongshan Culture'. As a measure to determine its unique aesthetic value, she compared it with the decorated pottery of other regions of the same period, including the characteristics, types, evolution rules, and distribution characteristics of the decorated pottery of Hongshan culture (Bai, 2007). In the article 'Discussing the Evolution of Painted Pottery Patterns of the Hongshan Culture', she highlighted those numerous forms of painted pottery patterns existed in the culture. The forms could be classified into two categories: natural and geometric patterns. The integration of the advanced agricultural culture of Yangshao in the south of China's Yanshan Mountain in the Hebei and Henan areas is the primary reason for the diversification of the coloured pottery decoration during the Hongshan culture period.

In the late Hongshan culture, witch paintings were the subjects of painted pottery decoration. The art of ornamentation of the red mountain culture in all its forms and colours was created by the evolution of economic forms and the continuous maturation and development of religion (Bai, 2008). By setting a precedent for the application of Hongshan painted pottery patterns in design, Wu Dong analysed the patterns from an artistic perspective and applied them to the design of cultural products in 'The Application of the Patterns of Hongshan Painted Pottery' (Wu, 2015). The characteristics of the painted pottery patterns of Hongshan according to time periods were first explained by Yang Hu's *Several Problems on the Hongshan Culture* (Yang, 1986) and Zhu Yanping's *Collection of Archaeological Culture* (Zhu, 1993). Nevertheless, without highlighting the details of the patterns, they only used the types of patterns to verify the division of periods.

A clear and detailed discussion of each period of Hongshan-painted pottery can be found in the research by Suo Xiufen and Li Shaobing on Hongshan culture. The morphological characteristics and patterns of each period are further outlined in their study (Suo & Li, 2011). The book 'Ancient Charm: Outline of Chinese Painted Pottery Art' by Cheng Jincheng presents the naming, classifying, and distinguishing period classification, and classification of the patterns of Hongshan painted pottery as well as the research findings in the aspects of religious and aesthetic significance (Cheng, 2001). The results of the research serve as the reference for the study into the use of the red-mountain painted pottery pattern in the cultural creative products in this paper. Characteristic analysis and evolution of Hongshan culture painted pottery patterns highlight the evolution process from the beginning to the peak and its subsequent decline. This information will serve as a reference for discussion in the formation and evolution of the Hongshan cultural painted pottery patterns.

Yan Shuqin, in the article 'Application of Traditional Abstract Decoration in Modern Culture Creative Design-Taking Liaoning Hongshan Cultural Painted Pottery as Example', analyses the meaning of culture and composition of clever ideas and thinking in the abstract ornamentation of Hongshan cultural traditional painted pottery. Specific explanations of historical evolutions in the Hongshan culture were provided based on the application of traditional abstract patterns in modern cultural and creative design (Yan, 2023).

Zhu Yanping's 'Exploring the Origin of the Patterns of Hongshan Cultural Painted Pottery' explored the decorative shapes of the known patterns, elaborated the patterns from the aspects of aesthetic characteristics, artistic beauty, anthropological significance and aesthetic characteristics, and examined the historical origin behind them. He believes that the frequently mentioned coloured pottery decorations of the Hongshan culture primarily include parallel diagonal patterns, hook-shaped patterns and Lin patterns. Parallel diagonal patterns commonly appear in the mouth of the red pottery bowl. Parallel diagonal lines are common in the mouth of the red pottery bowl along the exterior, referring to lines arranged in the same direction around the coloured pottery pattern, most often seen in black. The parallel diagonal lines on the exterior of the Hongshan culture's coloured pottery bowls and the cylindrical ceramic pots share a common decorative theme, both intentionally emphasising the same part of the pottery mouth.

The patterns and graphics are consistent. The tube-shaped jar from the Hongshan culture, with its mouth decorated with the 'killing seal' pattern, appears to be derived from the Xinglongwa culture within the Hongshan cultural system. The hook-shaped pattern in the coloured pottery of the Hongshan culture is often regarded as a variation of the arc-rimmed triangular pattern of coloured pottery of the Miaodigou culture from China's Yellow River basin. In fact, the hook-shaped pattern appeared in the early Xinglongwa site in Aohan County of Baiyin Changan. Thus, it is a traditional pattern from the Xinglongwa culture. The Hongshan culture, under a new historical context, reproduced these classical graphics in the form of coloured pottery. The coloured pottery in Hongshan culture also has a common multiple half-ring pendant arc pattern, commonly known as the scale pattern or curtain scale pattern. It is assumed that this type of decoration on sandy pottery is also likely to be rooted in earlier indigenous cultures of the region, such as the Fuhe culture in the Hongshan cultural system. Most of the other common coloured pottery decorations from the red mountain culture can be traced back to the pottery decorations from the Xinglongwa culture (Zhu, 2007).

Cao Yansheng investigated the evolution of the pottery ornamentations of Hongshan culture in his article 'On the Pottery Ornamentations of Hongshan Culture'. The article pointed out that the initial pattern of pottery was greatly influenced by braided fabric. The painted pottery patterns in the Hongshan culture use one or many parallel lines to form hollow triangular patterns, diamond patterns, and other banded patterns, as well as oval vortexes and deformed triangular patterns. The pottery patterns in the Hongshan culture are also primarily embossed with the character "Z" in horizontal and vertical ways. The pottery ornamentation of the Hongshan culture, which was dominated by the original "Z" character pattern, gradually developed and became complicated. The complexity is parallel with the development of society and the improvement of human aesthetic ability (Cao, 1990).

Wang Renxiang believes that the painted pottery of the Hongshan culture has its own system and outstanding characteristics and is related to the painted pottery found along the Yellow River. He classified the materials related to the Hongshan culture's painted pottery in the article 'Brief Introduction to Hongshan Cultural Painted Pottery' according to the Hongshan culture's painted pottery discovery, characteristics, meaning, origin, and destination. He pointed out that the painted pottery of Hongshan culture is mostly painted with black patterns on fine clay red pottery, and the painted surface is generally large, taking up most of the pottery's surface. The primary categorisation of painted pottery are earthen bowls, bowls, basins, pots, and kettles. The patterns of painted pottery are basically geometric patterns. The most distinctive patterns are ringling, curling, and overlapping arc patterns, as well as parallel diagonal, parallel vertical line, parallel triangular, and similar petal patterns (Wang, 2004).

In the article 'Brief Introduction to the Three Elements of Hongshan Cultural Painted Pottery', Mr Wang discussed the origin of Hongshan cultural painted pottery from the viewpoint of pattern elements. He believed that the double spiral, diamond, and noose patterns are obviously related to the painted pottery of Zhongtuo and the nearby Neolithic culture, and such correlation can be observed between the mentioned cultures and Banpo, Miaodigou, and Houmiaodigou cultures. From such correlation, it can be deduced that some elements of the painted pottery of Hongshan culture have had close exchanges with external cultures (Wang, 2014).

Shao Guotian, in his article 'Dragon Scale Pattern' and Analysing 'Dragon Scale Pattern' on Coloured Pottery of Yuyuan Museum', proposed that the widespread dragon scale pattern in Hongshan culture's coloured pottery is one of the typical patterns that distinguish Hongshan culture from other archaeological cultures of the Neolithic age. It is also one of the typical patterns academically recognised as the main symbol of dragon culture in Hongshan culture. Nevertheless, he believed that this dragon scale pattern is not related to dragon scales but rather represents the pattern of bird wings or feathers (Shao, 2014).

In his paper, 'The Mark of Chinese Civilisation: Niuheiliang Hongshan Culture', Song Zhichun examined the distribution, types, functions, and evolutionary patterns of pottery and decoration in Niuheiliang Hongshan culture. The paper analysed the form and decoration of pottery from the perspective of artistic form and explored their aesthetic value and significance in the origin and

development process of Chinese civilisation. It is believed that the pottery and decoration of Niheliang Hongshan culture have developed in terms of practicality, beauty, sacrifice, and ritual. In particular, cylindrical pottery and other related pottery developed into one of the main standards that reflect the rank and status differences between individuals and became the materialised carrier of "rites" (Song, 2013).

In his article 'Decorative Art of Hongshan Pottery', Wang Huide took the evolution of the pottery decoration of Hongshan culture as the reference and discussed the relationship between the patterns and aesthetic consciousness of the ancestors, which are reflected by the patterns. The article pointed out that the shapes and patterns of pottery are composed of points, lines, surfaces, and bodies that are varied and colourful. In addition to the realistic animal pattern, it is primarily rich in variation and abstract geometric patterns, such as a variety of points, curves, lines, water patterns, cycloidal patterns, triangles, circles, and many other patterns. It is believed that the pattern of pottery, particularly the shape, started from pragmatism and gradually developed, improved, and diversified into a form of ultra-pragmatism with certain aesthetic significance. Pottery of obvious aesthetic significance is usually grounded in reality. Nevertheless, it does not prevent it from having a deeper social meaning or being implicative.

The author divided the development of Hongshan pottery into three stages, with Xinglongwa and Zhabaogou cultures being the earlier stages. It is believed that the development of pottery types and shapes provided conditions for the standardisation of decorative patterns, which could be examined from various angles. The early geometric pottery of the Hongshan culture is the most typical remnant of the Zhabaogou and Hill sites. The geometric patterns are mainly comprised of two forms: straight line and hook shapes. Simple straight lines and curve decompositions and combinations constitute complex geometric patterns. A linear geometric pattern, composed of multiple units formed by oblique lines, generally adjusts its size, angle, and curvature in accordance with the changes in the diameter and curvature of the vessel. The typical pottery remnants of the Hongshan Hou culture are pots and bowls with varying shapes and structures. A trend of transcendent pragmatism can be observed in the pottery type of this period. The most obvious sign was the difference between sacrificial pottery and daily pottery items. The painted pottery of Hongshan Hou type is primarily composed of ribbon-shaped "tadpole" diagonal lines, triangular hooking paisley lines, deformed triangular lines, and diamond lines (Wang, 1989).

In the article 'Gestalt Coloured Pottery Found near Chifeng', published by Japanese scholar Bin Tiangengzuo in *Archaeology Magazine*, he introduced the excavated site of Gestalt-coloured pottery and defined the Hongshan pottery of that period as belonging to both the painted pottery culture and the red pottery culture (Tiangengzuo, 1937). In his article *Neolithic Times*, Yin Da analysed Hongshan pottery and believed that it has pottery features of Neolithic microstone culture that can be observed in the north of the Great Wall of China and Yangshao culture in the south of the monument. The similarity was caused by the mutual influence of the two Neolithic cultures in the north and south of the Great Wall of China (Yin, 1954). In addition, Liu Guoxiang, Wu Yaoli, and other scholars also studied the pottery patterns in the Hongshan culture from the perspectives of archaeology, anthropology, and history.

At present, the research findings on pottery patterns of the Hongshan culture are mainly focused on archaeology, anthropology, and history. Nevertheless, there is little research on the pottery patterns of the Hongshan culture from the perspective of aesthetics. The study of the Hongshan culture's pottery pattern's aesthetics is not only of great significance in the study of ancient history but also provides a unique perspective for the development of modern aesthetics and current art design.

3.3 Cultural and Creative Product Design

Cultural and creative products are categorised under cultural and creative industries. According to the definition of United Nations Educational, Scientific and Cultural Organization (UNESCO), cultural and creative industries comprise cultural products, cultural services, and intelligent property (IP) rights.

A cultural creative product is the modern expression of cultural resources through a creative presentation. It materialises the spirit of culture after the formation of a concept, requiring designers to integrate both tangible and intangible cultural elements. These concepts are drafted and transformed through design into products with creative and practical value for contemporary life.

Such products are commodities with high added value. These creative products usually have rich, specific cultural connotations and symbolic meanings, as well as uniqueness and differentiation. Designers interpret and analyse cultural concepts with the help of contemporary technologies and subsequently convert concepts into products that conform to modern life and have certain practical functions. In the process of materialising culture, some traditional cultures will acquire new values and connotations and become cultural symbols. Cultural and creative products are products with physical forms derived from these cultural symbols, which become favoured objects for consumer consumption and guide consumers to consume for the sake of culture.

The development of cultural and creative product design is closely related to national economic development. Thus, the research on cultural and creative product design started earlier in developed countries and primarily develops and spreads local culture according to local characteristics. For example, with prominent historical and cultural characteristics, cultural and creative product design in France includes microfilms of world-famous paintings in highly portable formats and models of iconic buildings such as the Eiffel Tower. Britain, which has a well-developed museum industry, operates effectively by relying on the income from cultural and creative product design of museum tourism under the policy of ticket exemption. In Japan, cultural and creative products often pay close attention to local culture and specific regional characteristics. Designs are based on local images, which result in unique products. For example, there are cultural and creative products themed around the high oxygen content of Mount Fuji, Nara's sika deer, and Kumamoto Prefecture's Kumamon bear, among others. Each of these cultural and creative product designs allows people to emotionally connect with the local culture (He & Xu, 2019).

In the study of cultural and creative product design, Peters K, in his work, *Negotiating the Place and Placement of Banal Tourist Souvenirs in the Home*, believed that items available in the market that allow consumers to recall their past experiences at home are cultural and creative products (Peters, 2011). In the work *The Souvenir: Messenger of the Extraordinary*, Beverly Gordon classified cultural and creative products into five categories for analysis and regarded them as special items for conveying information (Gordon, 1986). In the work *Product and Process Orientations to Tourism Shopping*, Yu et al. (2003) concluded that handicraft product characteristics in cultural and creative products positively impact tourists' experience. In other words, tourists are more likely to purchase products that have distinctive creative design features and reflect strong regional cultural characteristics (Yu et al., 2003). In their work on shopping satisfaction among domestic tourists, Turner and Reisinger (2001) argued that high-quality and cheap products, proper specifications and well-designed packaging, and product uniqueness are the three most important attributes of cultural and creative products.

In the work 'Current Situation Analysis and Design Research of Regional Cultural and Creative Product Design' (Li, 2021), the author analysed the lack of cultural connotation, design innovation, and other problems in past cultural and creative product designs. The current cultural and creative product design not only embodies deep regional cultural significance but also incorporates innovative elements, blending technology with design while balancing practicality and creativity.

In the article on the characteristics and attributes of cultural and creative products, Wei (2010) believed that such products refer to products from the field of cultural and creative industry. The products' cultural and creative content and external carriers are interdependent and inseparable. Culturally creative products generally take culturally creative ideas as the core. In these products, designers bring their spiritual understanding to life, creating cultural items that carry deep cultural meanings, symbolic significance, aesthetic educational value, and other spiritual attributes. Therefore, the cultural creative product design explored in this research is based on culture. Both the material and

non-material with cultural connotations are recreated and redesigned to form creative products with modern significance.

Lin (2016) suggested the concept of "three levels of culture" for the design of cultural and creative products, which is also the basic idea of designers in the process of designing such products. Culture can be divided into three levels: external, intermediate and internal. From the viewpoint of culture, the external level is tangible, the middle level is ritual custom, and the internal level is the invisible spirit. From the perspective of product attributes, the external level is appearance, the middle level is function and operation, and the internal level is emotion. Therefore, this study should prioritise the innovation of the external image of cultural creative products, the rationality of intermediate functions, and the inherent cultural deposits.

In summary, the design of Hongshan cultural creative products should take the cultural creative content as the foundation, where its cultural creative content is vital. Through the research and design of the Hongshan cultural patterns, two-dimensional creative content can be formed. The creative content can be reflected in the existing and extensive product range through printing and other technologies. The product range can be divided into daily necessities, such as mugs, bowls, umbrellas, and key rings; stationery items, such as bookmarks, postcards, notebooks, envelopes, and cardholders; clothing items, such as T-shirts, hats, and scarves.

3.3.1 Cultural and Creative Product Design of Daily Necessities

Cultural and creative products can attract consumers' attention and encourage purchasing behaviour by bringing art and design to people's lives, adding aesthetic feelings to their lives and improving their aesthetic taste. The basis of culturally creative products is daily necessities. Thus, the practicability of such products is very important.

In 'Brief Analysis of the Design Conception of Tableware Cultural and Creative Products' (Wang et al., 2017), the authors examined tableware cultural and creative products, analyse its design principles and procedures, strive to improve the public's confidence and demand for such products and provide a corresponding reference for developing such products.

In 'Innovation and Re-Application of Blue Clip Valerian Pattern: A Case Study of Mobile Phone Cases' (Xia, 2020), the author explored the innovation and application of the blue clip valerian pattern. The study integrated traditional handicrafts with modern design through a case study of mobile phone cases. It reflected on and examined research on the role of the blue clip valerian pattern, enriching its colour and design. This approach merges traditional printing and dyeing crafts with traditional product design, thus preserving cultural heritage while exploring its modern significance. Additionally, it develops the commercial value of this ancient folk craft, giving it new life and vitality.

In the article 'Exploration of IP Image's Cultural Creation Design on Tea Sets' (Zhao, 2021), the author explored the combination of cultural elements in tea set designs. The study aimed to promote traditional culture by ensuring that the tea sets reflect the beauty of history, culture, and modern design.

Therefore, the inheritance of Hongshan culture needs to adapt to the needs of time and integrate the culture into people's daily lives. In daily life, articles of daily use are crucial and frequently interact with humans. Integrating the Hongshan culture into daily necessities, such as key rings, cups, bowls, umbrellas, and other articles, to form a cultural and creative product system with the essence of life not only meet people's aesthetic, functional, and economic needs related to such products but also promote the design concept and Hongshan culture. For daily necessities, the integration of the Hongshan culture can enhance the value of the products themselves.

3.3.2 Cultural and Creative Product Design of Stationery

Besides the formation of the diversified, multi-level consumption structure, stationery has become prominent due to its unique cultural connotation and the characteristics of cultural goods. The trend of choosing personalised and fashionable stationery, driven by innovation, has become a consumption trend. The booming culture creative industry provides a good platform and policy support for the development of the stationery industry. As a result, stationery cultural creative products have emerged, injecting new vitality and development potential into the industry.

According to the article 'Influencing Factors of Material and Process Selection of Stationery Cultural and Creative Products at the Design End' (Liu, 2021), the influence of material and process selection on the design of stationery cultural and creative products is examined from three aspects: corporate brand tonality, user cultural experience, and green health concepts, through case analysis. It provides new ideas and methods for the development of cultural and creative stationery products.

In the article 'Stationery Product Design and Research Based on the Culture of Shenyang Imperial Palace' (Dong, 2017), the development of the cultural and creative business of Shenyang Imperial Palace was analysed and studied. The design and research market value of cultural and creative stationery was analysed in combination with the tourism pattern of Shenyang. Designers should delve deeply into cultural elements, combine culture, art, and stationery skillfully, and design attractive cultural and creative products based on Shenyang characteristics.

In the article 'Exploration and Research on Notebook Design in Cultural and Creative Products' (Di, 2020), paper notebooks designed around the valuable collection of the National Library of China offer an acceptable and meaningful form of expression for the educational functions of the library and promotes the library culture. This paper reviewed the design of these notebooks and addressed issues encountered during their development, summarising the design concepts of the National Library notebooks.

Stationery mainly includes items such as postcards, notebooks, bookmarks, and cardholders. Integrating Hongshan cultural elements into stationery creates creative cultural products that blend this culture into consumers' daily lives. This approach improves the industrialisation of stationery, actively explores the consumer demand for stationery with spiritual and cultural significance, and establishes the link between consumers and their aspirations for a better life.

3.3.3 Cultural and Creative Product Design of Clothing

In today's fashion design, people's understanding is continually improving, and aesthetic requirements are becoming increasingly high. There are a variety of clothing products, including clothes, hats, scarves, and others. With the development of society and the change in consumers' tastes, the traditional style of clothing products has gradually evolved. Therefore, changing existing thoughts and combining innovative design methods from traditional culture is essential to developing creative cultural clothing products.

The Chinese traditional cultural elements and modern designs are integrated into the design of silk scarves (Lian & Wu, 2021) to showcase the national aesthetics of unique Chinese traditional cultural elements. Rich silk scarves style designs also promote the inheritance and innovation of Chinese traditional culture.

The article 'Cultural and Creative Art Design of Traditional Clothing' (Song, 2021) analysed the most popular styles and elements in today's clothing industry. The article interpreted traditional culture and explored the cultural and creative design of traditional clothing, revealing the uniqueness of traditional clothing culture.

The article 'Design Research on Textile Cultural and Creative Products' (Zhu, 2019) defined textile cultural and creative products, analysed their reasons, current situation, and existing problems. The reasons for the emergence of textile cultural and creative products mainly include the following aspects. First, textile intangible cultural heritage needs to adapt to modern lifestyle and high and new technology through innovative development models. Second, the production of cultural and creative textile products is also closely related to the need for cultural inheritance and development. Third, the production of cultural and creative textile products has also been driven by market demand. The article also proposed that the basis for the development of quality cultural and creative products is the organic integration of elite culture and mass culture. Several examples of cultural and creative textile product design in Chinese museums were integrated. The article also summarised the concepts and methods that exhibit strong operability in the design of such products, covering aspects such as materials, techniques, styles and functions, as well as systematic development processes. Additionally, the Song Dynasty flower and bird painting served as the prototype for the experimental design.

Therefore, the integration of Hongshan culture and clothing provides a source of creativity and cultural resource for the cultural and creative clothing industry. Based on the current market environment, traditional culture should serve as an aspiration while encouraging active innovation, optimising the theme, and considering both artistic aesthetics and Hongshan cultural characteristics in the design of clothing and cultural products. Full use of graphic symbols, materials, and other elements with Hongshan cultural traits should be made to create designs that align with modern aesthetics.

4 CONCLUSION

This research reviews the research on the design and application of Hongshan pottery patterns in cultural and creative products from multiple perspectives. This research systematically introduces Hongshan culture and its important position in Chinese cultural history, which provides the theoretical basis and background knowledge for the subsequent literature review. The existing research on the Hongshan pottery pattern is comprehensively analysed, which provides theoretical support and practical guidance for the design of cultural and creative products. The review focused on the application of cultural and creative product design in different fields, including daily necessities, stationery, and clothing, showing the innovative application and artistic expression in different product designs. Lastly, the research summarises the primary content and determines the overall grasp of the literature review content and the direction for future research.

This research systematically reviews the existing literature on the design and application of Hongshan pottery patterns in cultural and creative products. Through the literature review, several key insights and gaps have been identified.

1. Existing research has extensively explored the historical significance, aesthetic characteristics, and symbolic meanings of Hongshan pottery patterns, establishing a solid theoretical foundation for their preservation and application.
2. Studies have demonstrated effective strategies for integrating traditional cultural elements into modern product design across different categories, including daily necessities, stationery, and clothing. These applications provide a practical reference for incorporating Hongshan patterns into contemporary designs.
3. Previous research has confirmed the market demand for cultural and creative products that reflect regional heritage, demonstrating that consumers value products that embody both cultural depth and modern practicality.

About unresolved issues and research gaps:

1. While studies have explored various aspects of cultural and creative product design, there is no established framework for systematically applying Hongshan pottery patterns to different product categories.
2. The challenge of maintaining the authenticity of Hongshan pottery patterns while adapting them for modern aesthetics and functions remains unresolved.

Further research is needed to develop design strategies that achieve this balance. Addressing these gaps requires further interdisciplinary research that combines cultural studies, design innovation, and consumer psychology. Future studies should focus on developing systematic design frameworks, conducting empirical consumer research, and exploring technological advancements to enhance the application of Hongshan pottery patterns in the cultural and creative industries.

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