

Integrating Sustainable Design Principles into Sichuan Qiang Embroidery Cultural and Creative Products: A Pathway to Cultural Preservation and Innovation

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Abstract: The integration of sustainability into the design of Sichuan Qiang embroidery cultural and creative products represents a significant convergence of traditional cultural heritage and modern design principles. As global awareness of cultural diversity and environmental protection grows, it is imperative to explore how sustainable development can be effectively embedded in the preservation and evolution of traditional crafts like Qiang embroidery. This study delves into the challenges faced by Qiang embroidery in the context of modern society, such as the need for environmentally friendly materials, innovative design, and market adaptability. The research outlines the unique historical, artistic, and social values of Qiang embroidery, emphasizing its importance as both a cultural symbol and an economic asset. By analyzing current market conditions and consumer behavior, this paper identifies gaps in the existing development of Qiang embroidery products, particularly in terms of sustainability. The study explores methods for integrating sustainable design principles into the design of Qiang embroidery cultural and creative products. By incorporating modern design techniques, sustainable material selection, production technologies, and usage models, the approach aims to enhance the market competitiveness and cultural influence of Qiang embroidery products. This not only facilitates the modern preservation and sustainable development of Qiang embroidery culture but also serves as a reference for the protection and development of other intangible cultural heritage.

Keywords: Sustainable Design; Qiang Embroidery; Cultural Creative Products; Cultural Heritage

1. Introduction

In the context of increasing global cultural diversity and heightened awareness of environmental protection, the integration of sustainable development principles into cultural heritage and modern design has become a critical issue in the field of cultural and creative product design. Qiang embroidery, a distinctive cultural heritage unique to the Qiang ethnic group in China, not only showcases the rich history and artistic achievements of this ancient people but also embodies the spirit and emotions of the Qiang community. However, with the acceleration of modernization, traditional crafts are facing unprecedented challenges. The urgent question is how to maintain the cultural essence of Qiang embroidery while achieving sustainable development in contemporary society.

As an important symbol of Qiang culture, Qiang embroidery holds unique historical, artistic, and social value. Its vibrant colors, exquisite patterns, and profound cultural connotations have earned it a significant place among China's intangible cultural heritage. Yet, amidst shifting market demands and evolving consumer preferences, the design and production methods of traditional Qiang embroidery products are increasingly exposing a number of shortcomings, such as the use of non-eco-friendly materials, lack of innovation, and poor market adaptability. Meanwhile, consumers' expectations for cultural products are on the rise, with a desire for items that not only possess unique cultural characteristics but also align with modern practicality and sustainability.

Against this backdrop, integrating sustainable design principles into Qiang embroidery cultural and creative product design represents both a respect for and preservation of traditional culture, as well as a positive response to environmental protection and social responsibility. By deeply exploring the

uniqueness and value inherent in Qiang embroidery culture, and integrating modern design approaches with the use of sustainable materials, new ideas and directions can be provided for the development of Qiang embroidery cultural and creative products. This not only bolsters the market competitiveness and cultural significance of Qiang embroidery products but also serves as a valuable model for the preservation and transmission of other forms of intangible cultural heritage.

Therefore, this study aims to explore how to effectively incorporate sustainable design principles into the design of Qiang embroidery cultural and creative products, thereby achieving a win-win outcome for both cultural heritage preservation and environmental protection. It endeavors to provide both theoretical underpinnings and practical guidance for the sustainable development of Qiang embroidery, a cherished traditional cultural treasure, within the context of modern society.

2. The Connotation and Characteristics of Qiang Embroidery Culture

2.1. The Historical Origins and Cultural Background of Qiang Embroidery

In antiquity, the term "Qiang" encompassed a dozen of nomadic tribes inhabiting northwestern China, with its connotation diverging significantly from its present-day understanding. The origins of the Qiang ethnicity can be traced back to the Xia and Shang dynasties^[1]. The ancient Qiang were among the earliest ethnic groups documented in oracle bone scripts, which date back over 3,000 years^[2]. Due to a series of migrations and interactions with the Han and Tibetan peoples, various subgroups developed, eventually forming the modern Qiang during China's extensive ethnic identification process after 1949^[3]. Today, the officially recognized Qiang ethnic minority has a population of over 300,000, mainly residing in areas such as the A' Ba Autonomous Prefecture and Mianyang City in Sichuan Province^[4]. They are the primary focus of this study.

Although the Qiang people do not have a written language, the embroidery on their textiles is filled with numerous cultural and historical symbols, earning them the reputation of being a people who "wear their history"^[5]. Qiang embroidery represents the materialized expression of the Qiang people's cultural and artistic concepts, serving as the most concentrated reflection of their historical development, a record of daily life, and a manifestation of their consciousness. It serves as a rich concentration of the social materiality and spirituality unique to the Qiang ethnicity, encapsulating the essence of their thoughts, religious beliefs, etiquette, and moral values^[6]. These embroidered pieces are not only essential items in the daily lives of the Qiang people but also serve as important carriers of the unique charm that spreads Qiang culture. (see Figure 1)



Figure 1: The Qiang Embroidery

2.2. The Artistic Features and Craftsmanship Heritage of Qiang Embroidery

Qiang embroidery, as an ancient intangible cultural heritage, possesses distinctive features in its patterns, color composition, and techniques. In terms of color usage, Qiang embroidery is bold and vibrant, dominated by contrasting hues such as red, green, blue, and yellow, creating a powerful visual impact and a unique aesthetic appeal. In pattern design, Qiang embroidery adheres to symmetry and balance, featuring rigorous compositions with rich variations. It encompasses both abstract geometric

shapes and concrete depictions of natural scenery and ethnic figures, showcasing the rich imagination and creativity of the Qiang people.

Regarding the transmission of skills, since the Qiang people have a spoken language but no written script, all Qiang embroidery techniques have been passed down orally from generation to generation. Qiang women begin training under the guidance of elders from a young age and apply their intelligence and creativity to master a variety of stitching techniques. They can flexibly adapt these techniques to different patterns and materials, giving the embroidery a delicate, even, and lively artistic effect. Additionally, Qiang embroidery pays great attention to detail, such as the fluidity of lines and the transition of colors, reflecting the embroiderers' high level of craftsmanship and their love for life and nature. Today, Qiang embroidery has gradually evolved into a nationally distinctive folk art system rich in content and unique in stitching methods^[7].

2.3. The Uniqueness and Value of Qiang Embroidery Culture

Firstly, Qiang embroidery possesses a unique artistic charm. It strives for visual beauty with a rich variety of designs, ranging from flowers and fruits to birds, animals, and geometric patterns. Every stitch and thread embody the wisdom and emotions of the artisans. The colors in Qiang embroidery are vivid and harmonious, skillfully using contrast and coordination to reflect the Qiang people's unique understanding of color. What makes Qiang embroidery particularly distinctive is its seamless blend of art and practicality; it is widely applied to everyday items like aprons and collars, enhancing daily life while preserving cultural heritage.

Secondly, Qiang embroidery holds significant historical and cultural value. On June 7, 2008, it was included in China's "Second Batch of National Intangible Cultural Heritage List". As a valuable representative of national intangible cultural heritage, Qiang embroidery is not merely a decorative craft; it is a unique expression of Qiang culture and a carrier of historical memory, serving as important material for studying the history, culture, and art of the Qiang people^[8]. Through Qiang embroidery, we can directly perceive the aesthetic concepts, daily customs, and spiritual world of the Qiang people, gaining insight into the history and current status of this ancient ethnic group. At the same time, Qiang embroidery is also a crucial medium for the transmission and development of Qiang culture. By preserving and promoting the craft of Qiang embroidery, we can better celebrate and advance Qiang culture.

Thirdly, Qiang embroidery also has significant economic and social value. With the development of tourism and the rise of the cultural and creative industries, Qiang embroidery has gradually become a cultural product with market potential. By developing Qiang embroidery into tourist souvenirs, cultural gifts, and other merchandise, it can not only promote local economic growth and provide additional income for residents but also increase the recognition and influence of Qiang embroidery culture, thereby enhancing ethnic pride and cultural confidence.

3. Analysis of the Current Status of Qiang Embroidery Cultural and Creative Products under the Concept of Sustainable Development

3.1. Origins and Development of Cultural and Creative Products

A cultural creative product is not only a tangible item but also embodies a distinctive form of 'creative activity'. What sets it apart from ordinary products is its primary reliance on culture, leveraging creative design as a driving force. It involves analyzing and transforming cultural elements inherent in various substances into design elements, and through this process, seeks to redefine those cultural factors into a new physical form that aligns with modern lifestyles and emotional needs^[9].

The emergence of cultural and creative products is driven by the advancement in productivity and the rising standards of living, along with increased cultural knowledge and literacy. The two industrial revolutions significantly boosted cultural creativity by advancing productivity from simple handmade to mechanized, standardized, and mass production systems. This shift met the growing demands of daily life but also flooded the market with simple, repetitive designs. But as economic and cultural integration deepened, people's pursuit of products extended beyond mere practicality and durability. They began to value artistic and aesthetic qualities, leading to a gradual dissolution of the gap between product design and artistic appreciation. As a result, the cultural value of products increased, giving rise to cultural and creative products^[10].

3.2. Integrating Sustainable Design into Cultural and Creative Product Development

In 1987, the renowned Brundtland Report introduced one of the most widely quoted definitions of sustainable development, stating it as 'development that fulfills the needs of the present without undermining the capacity of future generations to satisfy their own necessities' ^[11]. The concept of sustainable design arose in response to the increasing awareness of the environmental, social, and economic challenges confronting modern societies. Initially introduced by ecologists, this concept, known as ecological sustainability, seeks to illustrate the balance between natural resources and their exploitation and use. With the acceleration of industrialization, the repercussions of unsustainable practices, encompassing resource depletion, pollution, and ecological deterioration, have grown starkly apparent. This heightened awareness has sparked a collective urge among designers, policymakers, and consumers to explore alternative methodologies that harmonize current needs with safeguarding the welfare of future generations.

Sustainable development focuses on holistic and coordinated growth, ensuring that economic, social, and environmental systems develop in balance. Accordingly, the core concept of sustainable design encompasses three key aspects: environmental responsibility, social equity, and economic feasibility. Environmental responsibility involves reducing negative impacts on the environment throughout a product's lifecycle, from raw material extraction to disposal. Social equity ensures that design practices enhance human well-being and promote inclusive and fair societies. Economic feasibility highlights the importance of financial viability for the widespread adoption of sustainable solutions. These three pillars collectively guide the creation of products and services, aiming for a more sustainable and balanced future ^[12].

In the realm of cultural and creative product design, sustainability takes on even greater significance. Because cultural and creative products often embody substantial cultural, emotional, and economic value. The design and production of these items can have a profound impact on the environment, society, and culture. Design is more than just creating objects; it is a means of understanding and shaping the world according to the designer's vision. Thoughtful design has the potential to drive change and influence our surroundings. Neglecting sustainability in the design process means missing the chance to advance cultural preservation, social responsibility, and positive environmental impact ^[13].

Moreover, the integration of sustainable design principles into the cultural and creative sectors fosters innovation and creativity. It challenges designers to reimagine traditional practices and explore new avenues for cultural expression. This, in turn, leads to the development of products that are not only environmentally responsible but also aesthetically pleasing and culturally meaningful. The synergy between sustainability and creativity thus opens up new possibilities for designers to create products that resonate deeply with consumers, reflecting their growing awareness and demand for sustainability.

Therefore, as sustainable design continues to evolve, its application in the cultural and creative industries presents a powerful opportunity to create products that are not only functional and beautiful but also ethically produced and environmentally sound. This holistic approach ensures that design serves as a force for positive change, addressing the pressing challenges of our time while honoring the rich cultural traditions that shape our world.

4. Market Status of Qiang Embroidery Cultural and Creative Products

4.1. Analysis of Market Status, Consumer Demand, and Purchase Behavior of Qiang Embroidery Cultural and Creative Products

The current variety of Qiang embroidery cultural and creative products primarily revolves around traditional handicrafts, such as Qiang embroidery clothing, scarves, cushions, and embroidered bookmarks. These products, imbued with profound Qiang ethnic cultural heritage, have become vital showcases of Qiang culture through their unique ethnic charm and exquisite craftsmanship. They transcend mere functional items, serving as essential vehicles for transmitting and promoting Qiang traditional culture. (see Figure 2)



Figure 2: Qiang Embroidery Cultural and Creative Products

However, as the consumer market matures and consumer demands diversify, traditional handicrafts alone struggle to cater to the richness and variety of market needs. Modern consumers, when purchasing cultural products, prioritize not only the cultural attributes and aesthetic values of Qiang embroidery cultural and creative products but also their innovativeness and practicality, expecting innovative designs that integrate with modern lifestyles. This underscores the need for the research and promotion of Qiang embroidery cultural and creative products to evolve with the times, satisfying a broader range of consumers and enhancing the market influence and competitiveness of Qiang culture.

In terms of consumer preferences, survey results indicate that when purchasing Qiang ethnic cultural and creative products, consumers attach great importance to the products' special meanings, cultural characteristics, texture, design, and storytelling. Furthermore, there is widespread acceptance of incorporating Qiang indigenous culture into industrial product designs for daily use ^[14]. Regarding purchase behavior, consumers primarily choose products through tourist attractions and e-commerce platforms. Among these, products that offer reasonable pricing and are easy to carry are more popular. Brand recognition and consumer reviews significantly influence purchase decisions, with well-known brands and products with positive reviews more likely to gain consumers' trust and preference ^[15]. Consequently, while maintaining their unique cultural allure, Qiang embroidery cultural and creative products must also consider actual market demands, innovate, and adjust to better meet the diverse needs of consumers.

4.2. Analysis of the Deficiencies in Qiang Embroidery Cultural and Creative Products from a Sustainability Perspective

From a sustainability standpoint, although Qiang embroidery cultural and creative products carry rich cultural connotations and unique artistic value, several shortcomings remain evident in their development.

Firstly, the use of environmentally friendly materials is not yet widespread. Current Qiang embroidery products primarily rely on traditional fabrics and silk threads, which may involve significant use of chemical dyes and additives during production. Some metal components may also contain substances harmful to the environment. Additionally, the packaging of some products utilizes non-eco-friendly materials, such as plastics, or involves excessive packaging. These factors can contribute to environmental impact, suggesting that Qiang embroidery products need to consider their environmental impact throughout their life cycle ^[16].

Secondly, a lack of innovation has become a bottleneck limiting further development. Many existing products suffer from significant homogeneity and often lack creativity in their design. For instance, many products merely print or embroider Qiang patterns onto ready-made items, such as T-shirts and bags, without deeply exploring the cultural meanings and characteristics of Qiang embroidery. The use of Qiang patterns is often limited to a few traditional ones, like the ram's horn flower or cloud patterns, lacking diversity in design, which results in insufficient uniqueness and appeal. Additionally, there is a

lack of innovation in the application of Qiang embroidery techniques. While traditional Qiang embroidery skills are exquisite, they are often only used as decorative elements in modern cultural and creative products, without integrating modern technology, new materials, or exploring new forms of expression and application^[17]. This not only fails to meet consumer expectations for innovative designs but also restricts exploration and breakthroughs in sustainability.

Moreover, some Qiang embroidery products overly emphasize the layering of cultural elements, serving more as decorative pieces or souvenirs, while neglecting functionality and versatility. This limits their use in everyday life, affecting their long-term market competitiveness and sustainable development.

Finally, the instability of the supply chain is another issue that cannot be ignored. The handmade nature of production makes it vulnerable to external factors, such as the mobility of artisans and an unstable system for passing down skills^[18]. While many cultural and creative products rely heavily on machine embroidery for efficiency, this cannot replace the cultural essence embodied in handmade embroidery. Over-reliance on machine embroidery may even lead to a breakdown in the transmission of handicraft skills, hindering the preservation and promotion of intangible cultural heritage. Thus, an unstable supply chain not only affects the stable supply and market expansion of products but also poses challenges to sustainable production.

Therefore, in the future, Qiang embroidery cultural and creative products need to integrate sustainable design more thoroughly, balancing cultural, economic, social, and environmental considerations to achieve more enduring and robust development.

5. Exploring Design Methods to Integrate Sustainability into Qiang Embroidery Cultural and Creative Products

In today's world, where cultural diversity and environmental awareness are increasingly valued, the design of Qiang embroidery cultural and creative products must go beyond the deep exploration and inheritance of the Qiang people's unique cultural arts. It is also crucial to actively explore innovative ways to integrate sustainability concepts into these products. The following discussion will explore how to incorporate sustainability into the design practice of Qiang embroidery cultural and creative products, focusing on five key aspects: symbol extraction, material selection, processing techniques, usage patterns, and business models, with specific examples provided for each.

5.1. Symbol Extraction in Sustainable Design

Common natural elements found in Qiang embroidery patterns—such as beautiful flowers, lively animals, winding streams, and rolling clouds—are symbols of the Qiang people's reverence for nature and their harmonious coexistence with it. These elements also serve as an important source of inspiration for sustainable design. Designers can use modern design techniques, like minimalism or abstraction, to reinterpret these culturally significant symbols. For instance, a complex floral pattern could be simplified into flowing lines, or an animal's outline could be sketched with just a few strokes, retaining the cultural characteristics of Qiang embroidery while aligning with contemporary aesthetic trends. Additionally, designers can integrate eco-friendly concepts into the design of these natural element patterns, such as creating cultural and creative products that use Qiang embroidery motifs to convey themes like "Green Earth" or "Clean Energy," thus expressing a call for and attention to environmental protection.

5.2. Material Selection in Sustainable Design

When selecting materials for Qiang embroidery cultural and creative products, priority should be given to environmentally friendly, biodegradable, or recyclable natural materials. For example, using organic cotton as the base material for embroidery offers superior breathability and moisture absorption while ensuring environmental health through adherence to organic cultivation standards throughout the process. Bamboo fiber is another excellent choice, given its good antibacterial properties and biodegradability. Using organic cotton or bamboo fiber for home textile cultural products can provide consumers with more environmentally friendly options with unique textures. Meanwhile, bio-based materials derived from renewable resources—owing to their properties similar to traditional plastics and their ability to degrade naturally—can be used for embroidery accessories and packaging design, such as buttons, zippers, and bags. This approach can effectively reduce plastic pollution and comprehensively enhance the environmental value of the products.

5.3. Sustainable Design in Processing Techniques

5.3.1. Collaborative Innovation of Machine and Hand Embroidery

While preserving the traditional craftsmanship of Qiang embroidery, it is beneficial to incorporate mechanized auxiliary processes. For example, developing low-energy, easy-to-maintain intelligent machine embroidery systems can optimize the parts of patterns suited for machine embroidery while automatically highlighting key areas that require fine hand embroidery. This approach allows artisans to focus on enhancing the uniqueness and artistry of the hand-embroidered sections based on the foundation laid by machine embroidery. It improves production efficiency, controls costs, and retains the traditional charm of Qiang embroidery.

5.3.2. Combining Modular Design with Personalized Customization

On one hand, to ensure interchangeability and upgradability, the production elements of Qiang embroidery cultural products can be modularized, breaking down different production stages or product components into independent modules. These modules' production processes can be optimized to ensure they are efficiently and systematically produced or assembled. For example, separating the embroidered pattern from the base material design allows for replacing just the pattern when it becomes worn or outdated, effectively renewing the product. This design approach not only extends the product's lifespan but also reduces resource waste and environmental pollution.

On the other hand, user involvement is a key factor in enhancing a product's sustainability. Building on optimized production processes and material selection, personalized customization services can be employed in designing cultural products. Digital tools, such as online design platforms and 3D printing technology, can enable consumers to participate in the design of Qiang embroidery cultural products, allowing them to choose elements like patterns, colors, and materials according to their preferences and needs. The concept of eco-friendly and sustainable packaging can also be integrated into the customization process. This service not only satisfies consumer demand for personalization and increases product value and market competitiveness, but it also helps designers better understand user needs and market trends, leading to continuous product design optimization. Moreover, it contributes to sustainable production by minimizing waste, such as reducing paper use.

5.4. Sustainable Design in Usage Patterns

5.4.1. Durability and Maintainability

The design of Qiang embroidery cultural products should emphasize durability and maintainability to ensure long-term use. For instance, selecting abrasion-resistant and colorfast materials for the embroidery base and threads; adopting reasonable structural and process designs to improve the product's tensile and tear resistance; providing detailed care instructions and maintenance services to guide consumers in properly using and maintaining the products, thereby extending their lifespan.

5.4.2. Recycling and Reuse

In designing Qiang embroidery products, incorporating recycling labels and information on the products can encourage consumers to participate in recycling programs. For example, implementing a trade-in program where old products are professionally restored to their original condition and resold, or creatively transforming recycled products by adding new design elements and functions to turn them into unique regenerated products. This recycling and reuse model not only reduces resource waste but also gives Qiang embroidery cultural products a new life and value.

6. Conclusion

In this study, we systematically explored various methods for integrating sustainable principles into the design of Sichuan Qiang embroidery cultural and creative products. By analyzing the cultural background, pattern characteristics, and the current application status of Qiang embroidery in cultural products, we proposed specific strategies aligned with sustainable design principles. These strategies include optimizing material selection, improving production processes, and balancing traditional culture with modern environmental demands in design. Such approaches not only help to sustain the cultural vitality of Qiang embroidery, revitalizing it in the modern market, but also achieve the dual goals of cultural preservation and economic benefit.

Looking ahead, with the growing global emphasis on sustainable development, the design of Qiang embroidery cultural and creative products will have broader development prospects. Future research could delve deeper into sustainability assessments to quantify the environmental impact of Qiang embroidery products throughout their lifecycle. Moreover, enhancing international cooperation and exchange would help incorporate more advanced sustainable design concepts and boost the dissemination and influence of Qiang embroidery products in the market. Through continuous exploration and practice, we aim to promote the deep integration of Qiang culture with sustainable design, fostering the innovative development of traditional culture in a contemporary context.

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