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Exploring the Transformation of Traditional Hainan Li Brocade Patterns in Artistic Practice

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Abstract: Hainan Li Brocade stands as a pivotal component of China's intangible cultural heritage, distinguished by its unique system of patterns, a repository of the historical memory and cultural wisdom of the Li ethnic group. This study, centering on the artistic traits of Hainan Li Brocade patterns, intertwined with contemporary artistic creation exemplars, scrutinizes the contemporary metamorphosis trajectory of its visual symbols and delves into innovative strategies for applying traditional craftsmanship in artistic endeavors. By deconstruction and recombination, interweaving materials across boundaries, and transposing into the digital realm, Li Brocade patterns can contemporaneously activate the cultural essence in their lineage, aiming to illuminate a pioneering path for the perpetuation and rejuvenation of ethnic cultural heritage.

Keywords: Hainan Li Brocade; Pattern Attributes; Artistic Creation; Transformation in Practice

1. Introduction

Traditional Li Brocade represents a "living cultural specimen" of the Li ethnic group in Hainan, China, earning its place on the UNESCO Intangible Cultural Heritage list of urgent safeguarding in 2009 for its weaving, dyeing, and embroidery craftsmanship [1]. In recent years, as China's concept of safeguarding intangible heritage has evolved, academia and the realm of artistic creation have increasingly focused on breaking away from the static preservation model of traditional crafts and achieving a creative transformation of pattern symbols. By engaging in modern translation practices of Li Brocade patterns, not only can we infuse a contemporary vitality into ethnic culture, but we can also provide theoretical support for the development of cultural and creative industries in the context of rural revitalization. Through empirical analysis, this study aims to establish a dialogue mechanism between traditional craftsmanship and contemporary art.

2. Cultural Significance and Artistic Features of Li Brocade Patterns

2.1 Typological Analysis of Li Brocade Patterns

Hainan Li Brocade patterns, as a visual symbol system of the Li ethnic culture, can be categorized into four major types: Human figures convey ethnic beliefs through representational techniques, such as the "Creator-Hero Icon (Fa Ye Pattern)", which outlines the ancestral figure lifting the sky with concise lines, symbolizing worship of creation myths. Animal patterns are often inspired by natural beings; the frog pattern metaphorically alludes to reproductive worship through abstract geometric forms, while the Gangong bird (a mythical love-bird symbolizing marital fidelity in Li folklore) pattern uses symmetrical compositions to depict love legends. Within plant patterns, the kapok flower pattern conveys heroism through radial structures, and the fern pattern intertwines with the philosophy of life and propagation through spiral curves. Geometric patterns serve as the most common decorative language; the diamond pattern constructs spatial rhythms through positive-negative form contrasts, and the swastika " 卍 " pattern symbolizes universal cycles with its infinite extendibility. These four types of patterns collectively form the cognitive chart of the Li ethnic group's belief in the spirituality of all things. Li brocade patterns, diverse in nature, succinctly reflect the artistic imagery of Li ethnic aesthetic wisdom, serving as evidence of the Li society's transition from obscurity to civilization as projected through

ancient myths [2].

2.2 Decoding the Aesthetic Paradigm of Li Brocade Patterns

The artistic value of Li Brocade patterns stems from their unique visual logic system: the structural rules adhere to an order of beauty characterized by "continuous duality and extensive quadrilaterals". For example, in the long scroll of a wedding ceremony, the human-deer pattern repeats horizontally through unit patterns, creating a narrative visual flow. The color system, based on the indigo-dyed "Li Indigo (Liqing)", regulates the proportions of red, yellow, and white to form a color scheme that embodies a "warmth within coolness". Field surveys indicate that Li indigo accounts for 63.2% of traditional Li brocade, aligning with the color ethics of the Li people, who "hold blue in high esteem". The narrative function is reflected in the semantic coding of pattern combinations; exemplified by the *Wedding* picture (as shown in Figure 1), which utilizes 18 sets of pattern sequences —from Courtship Symbols to Bridal Procession Motifs —to vividly depict the matrimonial rites, constituting a unique "living archive" transmission mechanism.

Figure 1. Li Brocade *Wedding*

This aesthetic system embodies dual practical and symbolic attributes: the dense arrangement of diamond patterns in tube skirts not only meets durability requirements but also metaphorically alludes to the order of the heavens and earth through grid structures; in wedding attire, the proportion of red and yellow is increased to 40%, aligning with the principle of human visual focus while enhancing the ethnic ceremonial atmosphere. As such, the pattern system becomes the material carrier of the genetic essence of Li ethnic culture, providing quantifiable aesthetic parameters for contemporary design transformations [3].

3. Exploration of the Transformation Path in Li Brocade Artistic Creation Practice

3.1 Deconstruction and Reconstruction Design Method in Li Brocade Patterns

In the contemporary context of living heritage conservation, Hainan Li Brocade patterns are undergoing a paradigm shift from cultural specimens to creative genetic elements. Deconstruction and recombination, as twin dimensions of design methodology, utilize topological disassembly and systematic reconstruction to propel traditional patterns beyond the physical constraints of craft carriers. This transformation facilitates the cross-media regeneration of cultural genes in the realms of clothing, painting, and cultural and creative products. This mechanism of transformation is neither a simple replication of tradition nor a radical avant-garde experiment; it involves extracting cultural prototypes through deconstruction and constructing innovative practices of contemporary syntax through recombination.

In the field of fashion design, Li brocade patterns have achieved functional translation through material deconstruction [4]. Taking the graduation works of the Fashion Design Department at Hainan Normal University's Art College in 2025 as an example, the core Li brocade patterns—diamond geometric patterns and frog reproductive patterns—underwent topological analysis. By utilizing 3D scanning technology to obtain the warp and weft structure data of traditional fabrics, the two-dimensional patterns were deconstructed into 576 vector modules using the Grasshopper parametric platform. In the recombination phase, thermoforming technology was employed to implant the deconstructed pattern units into DuPont paper and ramie fabric blends, creating a three-dimensional relief effect with a precision of 0.2 millimeters. This technology empowerment allowed the tube skirt pattern to transcend flat weaving constraints, forming dynamic light and shadow layers in the three-dimensional tailoring of clothing. The designers preserved the original 60° crossing angle of the diamond pattern's genetic code, creating a variability pattern system through rotational assembly of modules. Each garment can exhibit 12 different pattern combination forms. This process of deconstruction and recombination not only continues the cosmic metaphor of Li brocade's "heaven and earth"

worldview but also reconstructs the traditional pattern's wearing experience through technological means.

In the realm of canvas painting, let us consider the series *Veins* by Professor Wang Yingsheng as an exemplar. Professor Wang has pioneered an experimental visual grammar reconstruction of Li brocade patterns. This creation is based on the Li ethnic group's "living archive", the *Wedding* picture, extracting five core color values from the spectral analysis of the pattern's palette, including Li indigo (RGB: 0/47/108) and vermilion (RGB: 218/70/36). Employing digital collage technology, the human and Gangong bird patterns were deconstructed into 317 visual fragments and geometrically reorganized in a Mondrian style on the oil canvas. Within the composition, the traditional wedding ceremonial track is deconstructed into a matrix of color blocks. Through the golden section ratio, the narrative logic is reconstructed: the densely red triangles in the lower right quadrant symbolize the warmth of the betrothal ritual, while the gradient Li indigo strip in the upper left hints at the temporal expansion of the bridal procession. This process of deconstruction and recombination allows the painting to transcend the closed nature of the pattern's representational system, constructing a contemporary visual grammar of cultural memory within an abstract composition.

In the field of cultural and creative product development, universal translation of cultural genes is achieved through symbol deconstruction. Targeting the Z-generation consumer group, the "Li Pattern Laboratory" team selected the Li brocade "swastika 卍" pattern for semiotic deconstruction, extracting two major cultural genes: "infinite extension" and "cyclic symbiosis". In the recombination phase, utilizing modular design principles, the team developed the "Myriad Forms" series of stationery products: the "swastika" pattern on the notebook cover was deconstructed into 24 magnetic modules, enabling users to freely combine them to form 256 pattern variants. The brass bookmark deconstructed the pattern lines into 0.3-millimeter three-dimensional grooves, filled with luminous resin to create a starry light trail effect. Sales data at the Hainan Cultural and Creative Market show that the recombination design of patterns in this product line has led to a 220% premium rate and a 3.6-fold increase in user interaction frequency, affirming the effectiveness of the deconstruction-recombination strategy in market conversion.

Three types of practices together constitute a methodological framework for the modern transformation of traditional patterns: fashion design focuses on the technical deconstruction of physical carriers, painting creation emphasizes the symbol reorganization of visual grammar, and cultural and creative products concentrate on the market translation of cultural genes. This multidimensional translational practice confirms that deconstruction and recombination are not about the dissolution of tradition but rather about providing new expressive mediums for cultural genes through topological transformations. When diamond patterns transition from traditional skirt hemlines to the light and shadow layers of smart fabrics; when wedding narratives shift from woven brocade rituals to color matrices; when eternal patterns yield infinite variations through user engagement, Li brocade culture truly transcends from heritage preservation to innovation-driven paradigm shift. This transformative path offers a replicable model for the dynamic inheritance of intangible cultural heritage, enabling traditional patterns to continually radiate with vitality throughout the dialectical movements of deconstruction and recombination in this era.

3.2 Cross-Boundary Material Experimentation with Li Brocade Patterns

In the contemporary transformation process of intangible cultural heritage, material innovation is emerging as a key variable in revitalizing traditional patterns. Through a triple cross-boundary experiment involving glass, concrete, and biological materials, the Li brocade patterns from Hainan break through the physical constraints of cotton and linen fibers, achieving heterogeneous expressions of cultural genes in dimensions such as optical refraction, architectural mechanics, and bio-mimicry [5]. This cross-boundary approach goes beyond mere pattern transplantation; it involves a chemical reaction between material properties and traditional cultural symbols, thereby restructuring the cognitive dimensions of the patterns.

Taking the installation *Pattern of Light* by glass artist Chen Yu as an example, a pioneering optical translation pathway for Li brocade patterns is unveiled. The experiment selects the core Li brocade pattern - the diamond geometric

pattern, embedding the pattern into a glass matrix through a high-temperature melting process. During the kiln transformation process at 1450°C, the pattern lines undergo a dual transformation of liquid flow and solid crystallization, culminating in micro-sculpted structures with a precision of 0.02 millimeters. When light penetrates, the traditional diamond pattern, under the influence of refractive indices, decomposes into a spectral matrix, projecting a dynamic color field. Experimental data indicates that when the angle of incidence is 56° (the traditional weaving loom tilt angle of Li brocade), the device can restore 85.7% of the original pattern features. This material transformation endows static patterns with photokinetic attributes, extending the cultural narrative of Li brocade's "path carried by patterns" in both spatial and temporal dimensions.

In the field of architecture, the concrete translation experiments by the "Li Structure" studio have realized the structural rebirth of symbolic patterns. The team conducted a topological analysis of the Li brocade human-shaped pattern, extracting its mechanically stable triangular support structure [6]. Through 3D printing technology, the pattern was deconstructed into 218 concrete modules, each unit incorporating steel mesh framework and stress sensors. In the reorganized building facade, the traditional human-shaped pattern was enlarged into a 4.5-meter-high load-bearing structure, with load distribution data indicating a 37% increase in compressive strength due to the triangular units. This transformation not only preserves the ancestral worship significance of the human-shaped pattern but also imbues practical functionality into the pattern through material properties, making the cultural symbol an organic component of the architectural mechanics system.

One of the most groundbreaking experiments comes from the field of bio-materials. Take, for example, the mycelium cultivation technology developed by the materials team at Tsinghua University. In this process, the Li brocade pattern gains biological activity expression. Researchers implanted geometric data of the Gangong bird pattern into an agar medium, controlling the direction and density of mycelial growth to reproduce along the pattern path. Under a constant temperature of 28°C, within 72 hours, the mycelium autonomously "weaved" a patterned structure with dimensional layers, achieving a similarity of 91.3% in form. During the natural degradation process, as the mycelium life cycle progresses, the pattern exhibits dynamic changes, following a cycle of "growth-death-regeneration", mirroring Li culture's ecological philosophy of "Cosmic Kinship".

Three types of experiments have established an innovative paradigm of interdisciplinary materiality: glass media has expanded the optical dimension of patterns, concrete has bestowed practical functionality upon cultural symbols, and biological materials have introduced a temporal variable. When traditional patterns break through the physical constraints of latitude and longitude, undergoing rebirth in light waves, stress fields, and microbial metabolism, intangible cultural heritage achieves a qualitative transformation from material preservation to energy conversion. This interdisciplinary experimentation not only provides new technological solutions for cultural heritage but also at the molecular level validates the universality of traditional pattern genes - those cultural codes engraved in Li brocade inherently harbor an expressive potential that transcends time and space.

3.3 The Digital Translation of Li Brocade Patterns

In the current landscape of cultural heritage reconstruction through digital technology, the Hainan Li brocade patterns are undergoing a transformation from physical remnants to digital genetic codes. This translation process goes beyond simple graphic digitization; it involves unlocking the cultural codes of the patterns through technological means, thereby activating their inherent vitality [7]. Three exemplary cases reveal different dimensions of translational pathways, establishing a dialogue system between traditional patterns and modern technology.

Genetic Mapping: Taking the digitized storage in the Oriental Weaver Database as an example, the Dongfang City Li brocade digital industry base has systematically accomplished the digitization of Li brocade cultural genes through the "Oriental Weaver" pattern database [8]. The project team conducted high-precision scanning and vectorized deconstruction of over 500 traditional patterns, establishing multidimensional data labels containing pattern

structures, color parameters, and cultural semantics. For instance, with the “Creator-Hero Icon (Fa Ye Pattern)”, researchers extracted 17 key geometric nodes through topological analysis to create an editable vector module library. The database not only ensures the permanent preservation of patterns but also opens access to global designers through API interfaces, transforming traditional patterns into programmable design elements. This translational pathway establishes a digital foundation for cultural genes, providing a standardized resource pool for future innovations.

Intelligent Symbiosis: Taking the AI-driven pattern evolution system in Wuzhishan City as an example, the AI design project, a collaboration between Wuzhishan City and the Marangoni Institute in Italy, has pioneered a human-machine collaborative creation model. The system analyzes 2,000 sets of traditional pattern data using machine learning, establishing three algorithmic modules: morphological generation, color optimization, and structural variation. When the intangible cultural heritage inheritor Wang Xiu-li inputs a hand-drawn sketch of the "Gan Gong Bird," the AI automatically generates 48 variant schemes, including minimalist geometric reconstructions and fluid dynamics simulations, among other innovative forms. The system's unique "cultural compliance detection" function can identify risks of semantic deviation in patterns, ensuring that innovation does not stray from cultural authenticity. This translation mechanism breaks the linear mode of intergenerational inheritance, endowing the pattern system with the ability to evolve autonomously.

Shaping Through Technology： Taking the dynamic expression experiment of 3D jacquard at Donghua University as an example, the research team at Donghua University has extended digital translation into the physical dimension. The jacquard fabric, debuted at the Paris PV Exhibition, was created by using 3D scanning to acquire micro-textural data of the gourd pattern, followed by finite element analysis to deconstruct its mechanical characteristics. In the digital recombination phase, a parametric weaving algorithm was developed, allowing the warp and weft density to automatically adjust according to the curvature of the pattern, achieving a three-dimensional embossed effect for traditional designs. The teal-to-green gradient was precisely controlled using nano-coating technology, with 120 color transition nodes per centimeter. This translation imbues static patterns with dynamic expressiveness, as the fabric exhibits a snake-scale-like iridescence under varying light conditions, breathing new life into millennia-old totems through technological empowerment.

The three translation pathways form a complete digital ecosystem: genetic storage addresses the risk of cultural discontinuity, intelligent design opens up innovative dimensions, and physical shaping enables value transformation. When the Leijin pattern leaps from warp and weft into digital bits and returns to material form, it completes the awakening and reconstruction of cultural genes. This translation is not a dissolution of tradition but rather a construction of a cross-temporal inheritance chain through digital technology, truly integrating intangible cultural heritage into modern production systems and aesthetic contexts. In the future, with the development of metaverse technology, the Leijin pattern may evolve into an autonomously developing digital life form in virtual space, ushering in a new era of cultural inheritance.

4. Conclusion

In December 2024, the 19th Regular Session of the Intergovernmental Committee for the Safeguarding of the Intangible Cultural Heritage of UNESCO reviewed and decided to move the "Traditional Spinning, Dyeing, Weaving, and Embroidery Techniques of the Li Ethnic Group" from the List of Intangible Cultural Heritage in Need of Urgent Safeguarding to the Representative List of the Intangible Cultural Heritage of Humanity. The modern transformation of Li brocade patterns is a long and challenging task, requiring cultural practitioners to find a balance between "preserving cultural roots" and "innovating in contemporary language," achieving an organic integration of inheritance and innovation. Future research may further explore cutting-edge fields such as AI-assisted design and metaverse scenario applications, enabling traditional patterns to truly integrate into the artistic creation ecosystem within a globalized context.

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