

A study on the modern translational pathways of traditional patterns: with lattice window design as the core carrier

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Abstract. This paper focuses on traditional Chinese patterns, taking lattice windows—an architectural element that integrates both decorative and cultural functions—as a representative carrier to explore their lineage of inheritance and pathways for modern innovation. The study begins with a systematic review of the essential characteristics, aesthetic implications, and cultural values of traditional Chinese patterns. Building on this foundation, it adopts lattice windows as the central research object and conducts a comprehensive analysis from multiple perspectives, including historical evolution, formal characteristics, application logic, and hierarchical differentiation. Furthermore, it elucidates the underlying principles governing the integration of traditional patterns with modern design concepts in terms of formal translation, functional reconstruction, and cultural expression. The paper also demonstrates the key mechanisms through which traditional patterns achieve temporal transformation and innovative development within contemporary environmental spaces. This research holds significant theoretical and practical value in promoting the contemporary revitalization of traditional design culture and advancing a deeper dialogue between traditional cultural heritage and modern design paradigms.

Keywords: lattice window, traditional patterns, carrier-based inheritance, modern design, cultural innovation

1. Introduction

Traditional Chinese patterns constitute a brilliant treasure of Chinese culture. Their origins can be traced back to totemic worship in primitive society. Through the ritualization of bronze decorative motifs during the Shang and Zhou dynasties and the cultural exchanges facilitated by the Silk Road, these patterns gradually evolved into a comprehensive artistic system encompassing geometric, vegetal, animal, and human motifs. Characterized by symmetry, balance, and fluid linearity, they not only embody distinctive aesthetic values but also convey profound cultural meanings, such as auspicious symbolism, hierarchical representation, and philosophical concepts. As such, they have become core cultural symbols permeating traditional artifacts, architecture, and everyday life.

Among the various carriers of traditional patterns, lattice windows, as a key decorative element in traditional Chinese architecture, not only vividly present the typological features and artistic essence of these patterns, but also integrate their symbolic meanings with practical functions through continuous craftsmanship evolution and hierarchical differentiation across historical periods. Consequently, lattice windows serve as one

of the most representative material carriers of traditional patterns. Based on this perspective, this paper takes lattice windows as its central research subject, systematically examining the application logic and historical evolution of traditional patterns within this medium. It further explores pathways for their innovative transformation in modern design, thereby providing both theoretical support and practical references for the living inheritance of traditional culture.

2. The historical development of Chinese lattice windows

2.1. The origin and evolution of lattice windows

In ancient dwellings, courtyards and roof openings served as the primary sources of lighting and ventilation. As time progressed, cave habitation gradually declined, and people began constructing above-ground houses, leading to the emergence of wall openings designed to admit light and air. These early window openings, known as you (牖), were initially rudimentary and unadorned. However, with advancements in craftsmanship and the refinement of aesthetic sensibilities, they gradually incorporated decorative functions. Within the broader trajectory of Chinese architecture, the evolution of windows is particularly distinctive. From simple apertures to the use of wooden lattices as partitions, and eventually to elaborately carved and painted forms, windows came to occupy an essential role in architectural ornamentation. Traditional Chinese window decorations frequently employed classical motifs, such as auspicious cloud patterns, symbolically rich lotus designs, and landscape imagery reflecting the natural world. These elements not only enhanced visual appeal but also conveyed deeper meanings associated with good fortune and harmonious ideals [1].

In their earliest form, lattice windows were primarily functional. Constructed with simple wooden frameworks arranged in horizontal and vertical grids, they were covered with paper or bamboo, serving to shield against wind and rain while allowing light to filter through. By the Tang and Song dynasties, however, craftsmanship had significantly advanced, and the range of available materials had expanded. Lattice windows gradually transitioned from purely utilitarian structures to refined artistic forms. Their construction became more robust, and their visual language increasingly sophisticated. Intricate window patterns—composed of well-ordered geometric configurations, elaborate depictions of flora and fauna, and vivid narrative scenes—transformed the lattice from a purely structural element into an expressive artistic medium. This evolution from simplicity to complexity reflected not only technical progress but also the cultural taste and social status of the inhabitants. Window decorations thus became integral to the artistic expression of classical Chinese gardens and residences [2]. During the Ming and Qing dynasties, the art of lattice windows reached its peak, characterized by remarkable diversity in form and exceptional craftsmanship. The use of precious materials, such as painted glass and hardwoods, became increasingly common, while carving techniques achieved a high level of refinement. At this stage, lattice windows transcended their practical role of lighting and ventilation, becoming symbols of wealth, status, and artisanal excellence. They functioned as both architectural elements and works of art, embodying the aesthetic preferences and social identity of their owners.

In the course of modern development, lattice window design has become increasingly diversified and technologically advanced. In contemporary architecture, window frameworks are no longer confined to wood; the incorporation of materials such as metal, plastics, and various types of glass has significantly enhanced functionality and safety. Modern design principles, emphasizing convenience and energy efficiency, have also led to a preference for simplified yet highly effective forms. Nevertheless, traditional lattice window designs continue to be preserved in certain contexts, particularly in heritage conservation and restoration projects, where they are revitalized as tangible witnesses to history. Today, whether in the pursuit of modern efficiency or the preservation of traditional aesthetics, lattice window design remains closely intertwined with the

harmony of interior and exterior environments, the aesthetics of living spaces, and the demand for individualized expression, continuing to play a distinctive and vital role in architecture and human habitation.

2.2. The functions and significance of lattice windows in traditional Chinese architecture

Within the architectural wisdom of ancient China, the function of lattice windows has long transcended the basic requirements of lighting and ventilation, evolving into a comprehensive architectural component integrating practical utility, aesthetic value, and cultural meaning. By mediating light and airflow, lattice windows enable a natural balance between brightness and shadow, as well as the circulation of air within interior spaces. In an era prior to the widespread use of glass windows, such design was particularly significant: it effectively introduced natural light, improved indoor environmental quality, and facilitated air exchange, thereby enhancing habitability under limited material conditions. At the same time, through structural strategies that balance openness and enclosure, lattice windows subtly regulate external visibility, granting occupants a degree of control over spatial privacy. This not only reflects the careful spatial planning inherent in traditional architecture but also embodies a broader philosophical orientation in Chinese culture—one that values inner order, spiritual tranquility, and clearly defined boundaries of private space.

From an artistic and cultural perspective, the patterns and forms embodied in lattice windows endow architecture with distinctive aesthetic character while serving as an important medium for the transmission and expression of traditional culture. The decorative motifs often draw inspiration from the natural world—flowers and plants, mountains and waters, birds and animals—yet these are not mere ornamental accumulations. Rather, they represent artistic projections of people's understanding of natural order, auspicious symbolism, and harmonious coexistence. In this sense, lattice windows not only embellish living environments but also subtly convey aesthetic ideals and cultural identity. When situated within a broader socio-cultural context, the form, craftsmanship, and degree of ornamentation in lattice windows frequently reflect the social status, family prestige, and cultural attainment of the building's occupants. Finely carved and intricately decorated lattice windows were commonly found in the residences of officials, scholars, and affluent families, serving as outward manifestations of social hierarchy and cultivated taste. In contrast, simpler and more restrained designs were prevalent in vernacular dwellings, expressing the everyday aesthetic pursuits and understated sensibilities of ordinary people. It is thus evident that lattice windows are not only the product of an integration between architectural technology and decorative art, but also a concrete manifestation of Chinese social and cultural values within the domain of everyday living spaces.

3. The application of traditional patterns in lattice window design

3.1. Traditional patterns in lattice windows

The evolution of lattice window patterns not only embodies the profound cultural heritage and unadorned ethos of the Chinese people, but also, through symbolic ingenuity, reflects a collective aspiration for harmony, joy, and abundance. As a decorative element, lattice window ornamentation occupies a prominent position within the visual composition of traditional Chinese architecture, forming a distinctive scenery where visual appeal and poetic ambiance are equally emphasized. Geometric motifs predominate, from which a variety of refined patterns have been derived, including straight lattice designs, angular motifs, and diamond-shaped configurations, all characterized by an elegant complexity.

Among the diverse repertoire of lattice window patterns, certain canonical forms distinguished by both hierarchical significance and symbolic meaning are particularly noteworthy. The "three-intersection six-panel rhombic pattern" (san jiao liu wan linghua), found in structures such as the Taihe Hall and Wenhua Hall of the

Forbidden City, represents one of the highest-ranking decorative forms in exterior architectural ornamentation. This pattern, commonly employed in Qing dynasty palace architecture, is constructed through the intersection of three lattice bars, generating a range of geometric compositions, including circular, rhombic, and triangular forms. It can further evolve into variations such as tortoiseshell patterns, circular-line motifs, and petal-line configurations, resulting in forms like qiu wen linghua (spherical rhombic patterns), guibei jin linghua (tortoiseshell rhombic patterns), and mantianxing liu wan dai aiye linghua (six-panel star-pattern rhombic forms with mugwort leaf motifs). These highly diverse configurations symbolically allude to the generative interaction between heaven and earth [3]. The "double-intersection four-panel rhombic pattern" (shuang jiao si wan linghua), as seen in the Jingren Palace, is a closely related yet slightly lower-ranking decorative form, composed of two intersecting wooden lattice elements. Another notable example is the "bubujin" (step-by-step brocade) pattern found in the Juanqinzhai Hall, which conveys the auspicious wish for continuous advancement. Craftsmen ingeniously assembled slender lattice strips into a sequence of rectangular frames, arranging them symmetrically along vertical and horizontal axes in accordance with classical aesthetic principles, thereby producing a sense of ordered harmony. The "oblique grid" (xiefangge) pattern, exemplified in Linxi Pavilion, consists of two sets of intersecting diagonal lines forming a series of rhombic shapes. This configuration is often interpreted as symbolizing the convergence of wealth and prosperity. Visually, such patterns embody both a tranquil structural order and a dynamic rhythmic quality. Within the broader symbolic system of traditional Chinese culture, the rhombus is frequently associated with the accumulation of wealth and the gathering of treasures. Its auspicious connotations extend beyond material abundance, metaphorically representing the convergence of all favorable elements and the flourishing of harmony. Consequently, oblique grid patterns are commonly understood as signifiers of prosperity and good fortune.

In addition, the swastika pattern (wanzi motif) and the ice-crack pattern (binglei motif) are also classical elements in lattice window design. The swastika pattern, based on the ancient "wan" symbol, is widely found across multiple cultural traditions and holds particular significance in Buddhism, where it represents auspiciousness and infinity. In lattice window compositions, the motif is typically arranged in repetitive and symmetrical configurations, producing a rhythmic visual order that conveys meanings such as longevity and universal good fortune. The ice-crack pattern, another widely used decorative form in traditional architecture, is composed of finely intersecting lines that emulate the natural fracturing of ice surfaces. These irregular yet layered lines create a sense of organic beauty, simultaneously ensuring light permeability and ventilation while endowing the lattice window with substantial decorative and artistic value. Symbolically, the ice-crack motif is often associated with the thawing of winter and the arrival of spring, thus representing vitality and renewal.

3.2. Hierarchical differentiation of lattice window patterns

Within the architectural vocabulary of ancient China, the design of lattice window patterns functioned not merely as an aesthetic pursuit, but also as an implicit marker of social hierarchy and status. This differentiation was largely determined by factors such as the building's function, geographical context, and the social standing of its owner [4]. Among the wide array of patterns, the three-intersection six-panel rhombic pattern occupied the highest rank, followed by the double-intersection four-panel rhombic pattern. In imperial palaces, aristocratic residences, and the dwellings of high-ranking officials, lattice window ornamentation tended to be highly intricate and elaborate. Techniques such as gold leaf inlay and polychrome painting were frequently employed to underscore the prestige and honor of the occupants.

In contrast, the lattice windows found in the homes of common people were generally characterized by simplicity, practicality, and an understated aesthetic. These designs favored naturalness and restraint, reflecting both material limitations and a preference for modest beauty. Nevertheless, even within such restrained forms,

ordinary people often selected or personally designed auspicious patterns in accordance with their financial means and aesthetic inclinations, subtly embedding their aspirations for a better life into the fabric of everyday living.

In modern society, the rigid hierarchical distinctions once associated with lattice window patterns have gradually diminished. Contemporary design places greater emphasis on aesthetic expression, creative innovation, and individual identity. Despite this shift, lattice windows, as carriers of traditional cultural essence, continue to be deeply influenced by classical aesthetics. They function as a bridge across time, connecting historical traditions with contemporary cultural expression and sustaining an ongoing dialogue between past and present.

4. Innovative applications of traditional patterns in modern lattice window design

4.1. Contemporary translation of traditional patterns in the lattice windows of the Suzhou Museum

The Suzhou Museum, a representative work by I. M. Pei, exemplifies the integration of traditional Chinese architectural aesthetics with modern design methodologies. It reflects both a profound understanding of the cultural depth of tradition and an innovative application of contemporary architectural language. The overall architectural composition continues the classical elements of Jiangnan gardens, where white walls and grey tiles are complemented by lattice window patterns composed of geometric forms such as squares, circles, and rhombuses. This synthesis not only embodies the essence of traditional culture but also imbues the structure with a distinct sense of modernity.

In the design of the museum's main hall, particularly its glass roof, I. M. Pei skillfully combines straight-line lattice patterns with rhombic motifs to produce a unique visual effect. This design not only ensures structural stability and maximizes the use of natural daylight, but also achieves a seamless integration of traditional lattice aesthetics with modern architectural technology. Light filters through these geometric openings, interacting dynamically with both the exhibited objects and the movement of visitors, thereby creating a spatial experience characterized by fluidity and layered visual depth. The selection of materials and construction techniques—most notably the use of steel and glass—ensures the building's modernity and durability, while simultaneously contrasting with the more traditional material textures, thus highlighting the advanced nature of the design. Through this conceptual framework, the Suzhou Museum stands not only as a landmark of modern architecture but also as a continuation of the spiritual essence of Suzhou's classical garden architecture. In this dialogue between tradition and modernity, the museum serves as both a vital medium for showcasing the cultural essence of Chinese architectural heritage and a model for innovation in contemporary design.

4.2. Trends and significance of pattern transformation in modern design

Within the context of modern design, the transformation of traditional patterns has moved beyond mere formal innovation to become an important vehicle for cross-temporal cultural dialogue [5]. This transformation incorporates minimalist and abstract modern aesthetics, cross-cultural design languages, and innovative approaches that integrate technology with artistic expression. In doing so, it preserves the spiritual core of traditional culture while rearticulating it in forms that align with contemporary aesthetic sensibilities, thereby embodying the dual imperatives of cultural inheritance and creative innovation.

From a developmental perspective, the application of patterns in modern design exhibits three primary characteristics. First, there is a tendency toward simplification and abstraction: overly intricate details found in traditional motifs are distilled into essential visual elements, which are then reconfigured to achieve a balance between functional utility and formal aesthetics. Second, there is an increasing integration of cross-cultural elements. Against the backdrop of globalization, designers actively draw upon diverse cultural resources, allowing traditional patterns to interact and merge with foreign visual symbols, thereby enriching their cultural connotations. Third, modern technological tools play an enabling role. Techniques such as parametric design and digital modeling facilitate innovative reinterpretations of traditional patterns, meeting contemporary demands for personalization and diversity in aesthetic expression.

The significance of this transformation is both profound and enduring. In terms of cultural transmission, it promotes the shift of traditional patterns from static historical artifacts into living components of contemporary design language, enabling their dynamic continuation within modern life [6]. From the perspective of industrial development, it enriches the conceptual scope of the design industry, offering new approaches and pathways for innovation while enhancing the cultural value embedded in design works. At the societal level, it contributes to the cultivation of public cultural awareness and aesthetic literacy, providing essential support for the construction of a socio-cultural environment characterized by both historical continuity and cultural confidence, and reflecting the progressive advancement of cultural consciousness and aesthetic pursuit in the contemporary era.

5. Conclusion

Taking lattice windows as the central research carrier, this study systematically reviews the cultural connotations and aesthetic characteristics of traditional Chinese patterns. It further examines in depth the historical evolution and functional significance of lattice windows, as well as the application logic and hierarchical differentiation of traditional patterns within lattice window design. Drawing on practical cases such as the Suzhou Museum, the paper ultimately analyzes the innovative pathways through which traditional patterns are translated into modern lattice window design, thereby offering a comprehensive response to the core proposition of the "modern translation of traditional patterns".

The findings indicate that lattice windows, as one of the most representative material carriers of traditional patterns, not only embody the construction wisdom, aesthetic sensibilities, and socio-cultural values of ancient Chinese architecture, but also serve as a vital cultural link bridging tradition and modernity. Traditional patterns should not be regarded as static historical relics; rather, their principles of symmetry and balance, their cultural emphasis on auspicious symbolism, and their dynamic and versatile formal language demonstrate an inherent compatibility with modern design concepts such as simplicity, functionality, cultural expression, and individual innovation. Moreover, the modern translation of traditional patterns is not a matter of superficial replication or mechanical assemblage of elements. Instead, it entails preserving the cultural essence while achieving an organic integration of function and aesthetics, as well as tradition and modernity, through strategies such as formal simplification, abstract reconstruction, material innovation, technological empowerment, and cross-cultural synthesis. This process constitutes the key mechanism through which traditional design culture attains dynamic continuity and sustainable development in the contemporary context.

References

- [1] Song, A. Y. (2022). An analysis of the application of Qiang embroidery patterns in interior textile design. *Dwelling House*, (29), 27–29.

- [2] Zuo, X. S., & Ma, X. Y. (2008). Spatial adjacency and framed scenery: The application of lattice windows in modern villa design. *Journal of Beijing Agricultural College*, (2), 46–49.
- [3] Yang, Y. J., & Shi, M. Y. (2025). The application of traditional Chinese costume elements in animation costume design. *Screen Printing Industry*, (2), 14–16.
- [4] Song, Z. Y. (2014). Analysis of common problems and solutions in architectural structural design. *Urban Architecture*, (4), 66.
- [5] Wang, W. W., Peng, X. H., & Yang, X. Y. (2017). Application of shape grammar in the evolutionary design of traditional patterns. *Packaging Engineering*, 38(6), 57–61.
- [6] Zhang, Y. Q., Chen, F. Y., Tian, Z. B., & Yao, M. (2025). Innovative IP image design based on intangible cultural heritage cloud shoulder elements. *Shanghai Packaging*, (9), 59–61.