

Integration of Intangible Cultural Heritage Elements into Furniture Design Based on Symbolic Semantics and AHP: A Case Study of Qianci

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This study explored methods for integrating intangible cultural heritage (ICH) elements into modern furniture design, using Qianci as an example. Through symbolic semantics analysis, the cultural external layers of form, color, craftsmanship, and composition and the cultural internal layers of symbolic meaning, ideological consciousness, religious beliefs, and moral ethics of Qianci symbols were interpreted, extracting core design elements suitable for modern furniture design. Based on the Analytic Hierarchy Process (AHP), a hierarchical model was established to integrate intangible cultural heritage symbols with furniture design, quantitatively analyzing the importance of key elements in the design process. The results indicate that cultural symbolism meaning, form design, cultural element integration, pattern decoration, environmental protection, and cultural heritage value are key indicators in furniture design. Accordingly, two thematic furniture design proposals were developed and evaluated, confirming the innovative potential and application value of Qianci symbols in modern furniture design. This study provides new perspectives and practical examples for the revitalization of intangible cultural heritage elements and the diversification of furniture design.

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INTRODUCTION

Integrating intangible cultural heritage (ICH) into contemporary design is a growing priority, driven by the need to safeguard cultural authenticity while meeting ever-evolving market demands. Researchers have shown that symbolic semantics can effectively bridge tradition and innovation. This has been exemplified by Xue (2021), who demonstrated how ceramic product forms can convey emotional and spiritual dimensions, and by Xiao *et al.* (2021), who examined the evolving civic identity in Guangzhou's urban landmarks. Additional evidence of the potency of semiotics for design appears in Xu and Zhou (2019), whose analysis of flower-themed tourism products demonstrated how color and “place spirit” can enhance a product's cultural appeal, and in Wang (2023), who illustrated how cultural motifs (Lingnan plaster sculpture) can be reinterpreted to preserve heritage. Meanwhile, Li and Yu (2023) underscored how festival landscapes leverage symbolic elements to influence tourist experiences, and Feshchenko (2023) further revealed how semiotic models deepen our understanding of aesthetic and communicative

acts in art. Moreover, Vallverdu and Marine (2023) highlighted the role of graphic design semiotics in activating public environmental awareness—reinforcing that culturally driven imagery can inspire social change.

However, symbolic insights alone often fail to address functional, economic, or sustainability factors in design. The Analytic Hierarchy Process (AHP) has emerged as a robust multi-criteria decision-making (MCDM) framework to accommodate such complexities. In various contexts, scholars have used AHP to clarify competing priorities. Yu *et al.* (2023) showed that price dominates online furniture purchasing, whereas Sun *et al.* (2023) traced how sustainable innovation steers Huaihe willow weaving, and Singer and Özşahin (2023) identified safety and environmental friendliness as vital for wooden outdoor furniture. Extending AHP's utility, some researchers have integrated it with complementary tools—such as TRIZ (Ruano and Huang 2023), fuzzy logic and TOPSIS (Tüysüz and Kahraman 2023), GIS (Wang *et al.* 2024), or QFD (Li *et al.* 2023)—to systematically handle technical contradictions, enhance reliability, and guide spatial or architectural decisions. AHP has also supported healthy building indicators (Shao *et al.* 2023) and illuminated user-centered product strategies, as seen in Chen *et al.* (2024) and Yu *et al.* (2024), who, respectively, reconciled engineering difficulties in willow furniture design and emotional factors in children's furniture. Beyond indoor products, Chen and Hu (2024) underscored the broader role of semiotics in urban environments, revealing how shared-street designs can balance historical identity with contemporary transport requirements.

Despite these advances, few studies systematically fuse symbolic semantics with AHP for ICH-inspired furniture design. Symbolic research typically zeroes in on cultural or emotive significance, whereas MCDM approaches prioritize measurable factors such as cost, user demands, and sustainability. Therefore, this paper proposes a holistic framework that merges cultural signifiers with a robust decision-making protocol, aiming to preserve ICH symbolism while meeting contemporary functional imperatives. The subsequent sections delineate the theoretical foundations, methodological steps, and case-specific findings of this approach, offering a replicable pathway for integrating heritage and innovation in modern furniture development.

EXPERIMENTAL

Research Idea

Qianci, which literally means “inlaid porcelain,” is primarily distributed in the Chaoshan region of Guangdong, the Minnan region of Fujian, Taiwan, and among overseas Chinese communities in Southeast Asia. As a traditional folk craft that integrates sculpture, painting, and architectural decoration (Li *et al.* 2024), Qianci primarily uses vibrant broken porcelain pieces as its main material. Through skillful assembly and meticulous carving, various themes are vividly presented on traditional buildings, breathing life into structures and earning the title “Art on the Eaves.” Qianci exhibits a rich array of images and artistic concepts, imbued with profound cultural symbols and historical significance. It has been listed as a national ICH, deeply influenced by local traditional culture and showcasing strong regional characteristics. Particularly within the clan atmospheres of the Chaoshan region, Qianci is frequently applied to the ridges of ancestral halls and traditional residences (Wei *et al.* 2024).

Focusing on Qianci as the research object of ICH, the study first employs symbolic semantics to analyze Qianci symbols, extracting core design elements suitable for modern furniture design and clarifying their symbolic value and aesthetic features. Subsequently, based on the AHP, the extracted core elements and other criteria layers are integrated to establish a hierarchical analysis model. Finally, by obtaining weight data, the importance of key elements in the design process is quantified, and innovative application strategies are proposed (Fig. 1).

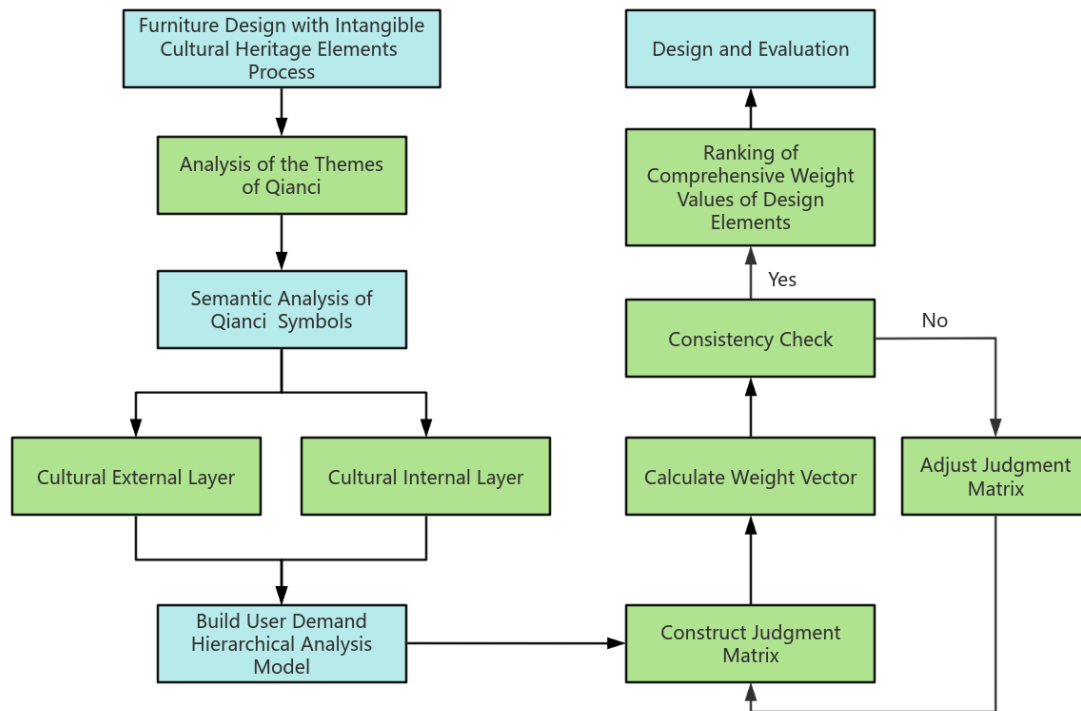


Fig. 1. Research framework of ICH elements in furniture design

Crafting Techniques of Qianci

Qianci craftsmanship utilizes the high hardness and corrosion-resistant properties of ceramics, skillfully combining colored porcelain fragments to display rich patterns and motifs. Its unique craftsmanship techniques enhance the malleability of the works, allowing discarded porcelain pieces to gain new life. Artists create novel and varied forms through methods such as cutting, pasting, and assembling, showcasing strong artistic expression and emotional impact. Depending on the method of presentation, Qianci can be divided into three categories: flush inlay, raised inlay, and three-dimensional inlay, as shown in (Fig. 2). The Qianci craftsmanship originates from the exquisite use of ceramic materials, typically involving the clever combination of colored porcelain pieces on the surfaces of buildings or artworks. The selection of materials and craftsmanship are the core of Qianci production (Yin and Lin 2023).

Flat inlay, relief inlay, and 3D inlay represent three distinct techniques in ceramic inlay artistry, each offering unique visual and structural characteristics. In flush inlay, shards are embedded directly onto a flat surface, such as a wall or decorative panel, while the mortar is still wet. Artisans align the pieces meticulously to ensure minimal protrusion and a uniform texture, making this technique ideal for large, continuous patterns, geometric designs, or background sections. Raised inlay, by contrast, involves creating an elevated or

contoured mortar layer onto which shards are arranged along ridges or shallow reliefs. This method enhances depth and shadow effects. The most intricate form, three-dimensional inlay, requires artisans to sculpt rough forms or frameworks—often supported by wire—before arranging shards to build fully dimensional figures, animals, or architectural ornaments. This technique demands exceptional skill in sculpting and shard placement to account for curvature, balance, and visual flow, resulting in strikingly dynamic and lifelike creations. Together, these techniques showcase the versatility and craftsmanship inherent in ceramic inlay art.

A key to Qianci is the mastery of multiple stages—from selecting shards of suitable color or pattern, to shaping them to fit complex contours, to securely embedding them in layered mortar. In many traditional workshops, artisans rely on hand tools (*e.g.*, tile cutters, pliers, or custom knives) and carry out detailed finishing to ensure shards fit seamlessly. The bonding process involves choosing adhesives or grouts compatible with local climates, preventing water infiltration or cracks over time.

Because each step demands precision the overall craftsmanship is labor-intensive and rooted in generational knowledge. The successful fusion of material selection, mortar preparation, ceramic shaping, and artistic composition produces Qianci's signature rich textures and exquisite visual effects, which often adorn temples, ancestral halls, and traditional residences in the Chaoshan region.

By closely following these systematic procedures, Qianci artisans preserve both aesthetics and structural integrity, ensuring that each composition not only captivates visually but also withstands environmental stresses. Through this combination of innovation and tradition, Qianci illustrates how discarded ceramics can be reborn as elaborate art forms, reflecting cultural heritage and artistic ingenuity in the built environment.



Fig. 2. Three artistic forms of Qianci

Analysis of the Themes of Qianci

Qianci art, which is characterized by vibrant colors, dynamic sculpting, and diverse forms, profoundly reflects the rich and varied culture and history of the Chaoshan region. The decorative motifs primarily fall into four categories: birds and auspicious beasts, plants and flowers, aquatic creatures, and figures stories (Song and Liao 2022). These themes

embody auspicious meanings, appreciation of nature, folk heritage, and historical myths, showcasing Qianci art's profound pursuit of folk emotions, regional culture, and aesthetic values through exquisite craftsmanship and unique expressive methods (Fig. 3).

Birds and Auspicious Beasts Motifs feature representatives such as loongs (Chinese dragons), phoenixes, qilin, and magpies, symbolizing good fortune, wealth, longevity, and wishes fulfilled. These motifs reflect the educational function and folk characteristics of Qianci art. Plants and Flowers Motifs are dominated by peonies, chrysanthemums, lotuses, and plum blossoms, expressing people's love for nature and life, and highlighting a deep appreciation of natural beauty. Aquatic Creatures Motifs, including fishes, corals, shells, and pearls, showcase the unique marine culture and fisherfolk life of the Chaoshan region, reflecting respect and reverence for marine culture. Figures and Stories Motifs derive from classic characters and stories in history, folklore, opera, and mythology, embodying the inheritance of traditional culture and the pursuit of aesthetic values.

These motifs, through precise control of form, color, dynamics, expressions, and narratives, demonstrate the superior craftsmanship and unique style of Qianci art, highlighting its significant contribution to promoting folk culture and regional characteristics (Yuan and Yang 2021).

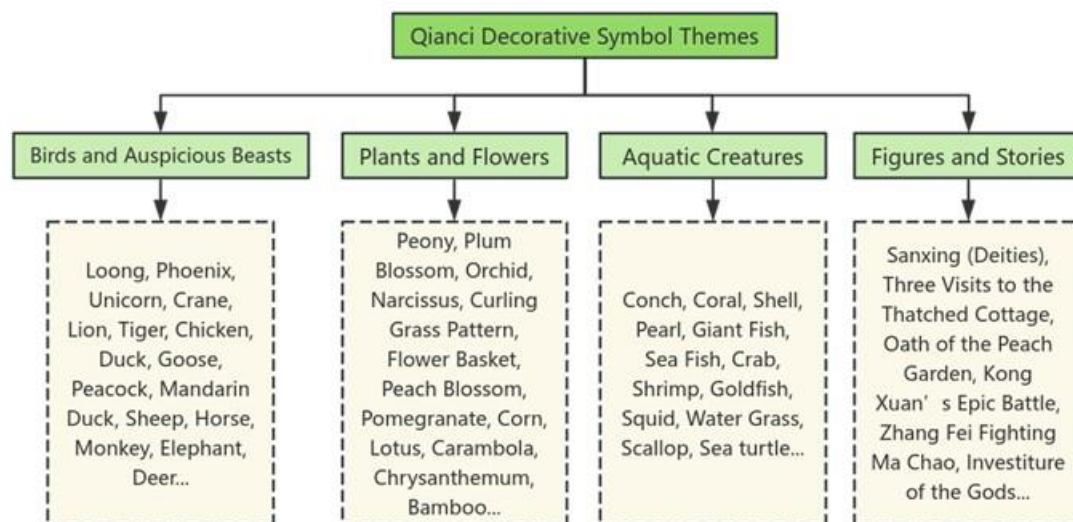


Fig. 3. Qianci decorative symbol themes

Semantic Analysis of the Cultural Symbols of Qianci

The selection of Qianci cultural symbols involved a comprehensive and systematic approach to ensure that the chosen motifs are not only aesthetically appealing but also rich in historical and cultural value. The goal was to identify symbols that are culturally representative, embody deep cultural connotations, and possess unique morphological characteristics with high visual recognizability. Particular attention was given to the expressiveness of colors, the complexity of craftsmanship, and the diversity of materials, ensuring a balance between aesthetic value and practical applicability.

To achieve this, a systematic selection process was implemented, combining field investigations and literature research. On-site examinations were conducted in ancestral halls, temples, and traditional residential buildings across the Chaoshan region to record and catalog typical Qianci motifs. Simultaneously, relevant historical documents and scholarly works were reviewed to gain a deeper understanding of the cultural and historical significance of these symbols. The analysis was carried out across multiple dimensions,

including visual appeal, the significance of historical heritage, regional cultural identity, and the feasibility of implementing the motifs in modern craftsmanship.

Based on these comprehensive evaluations, four highly representative motifs were selected: Loongs Playing with Pearls, Peony Blossoms, Ao Fish (鳌鱼) with Scroll Grass, and Sanxing (Deities) (Fig. 4). These motifs were chosen for their ability to balance symbolic richness with design adaptability, making them ideal for integrating Qianci elements into contemporary furniture design. This detailed and methodical selection process ensures the cultural and practical relevance of the chosen symbols within the scope of this study.

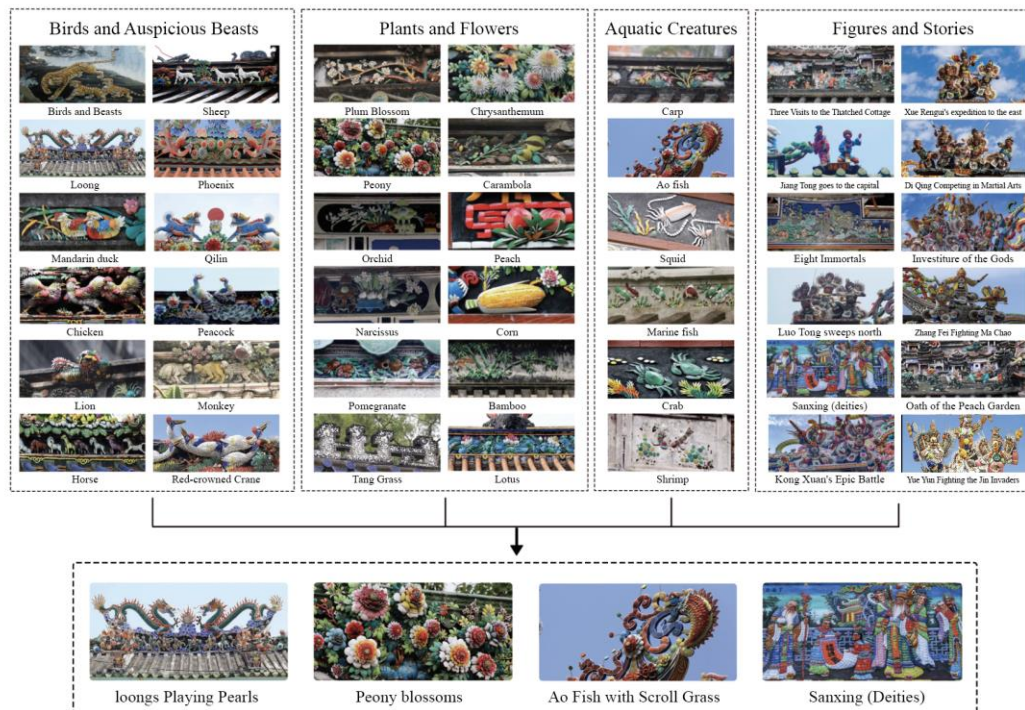


Fig. 4. Screening of common themes of Qianci decorative symbols

Symbolic semantics is the study of the relationship between symbols and the objects they represent. It focuses on the meanings and cultural connotations of symbols, revealing the interaction patterns between symbols and culture through the analysis of their denotation and connotation (Wang and Zhang 2024). In Qianci art, this is primarily manifested in the external and internal cultural layers.

External Cultural Layer refers to the explicit and overt meanings of symbols, which remain unchanged regardless of historical culture or individual influences, thereby possessing relatively objective and stable characteristics (Zheng and Wang 2024). In the external cultural layer, aspects such as the form, color, craftsmanship, and composition of Qianci art are significant manifestations of symbolic semantics (Table 1). Symbols are not only a means of expression but also a way of thinking, reflecting people's worldview, values, and aesthetic perspectives. The forms and compositions in Qianci often employ techniques such as symmetry, balance, and repetition to achieve visual harmony and aesthetic appeal. The colors used in Qianci typically include red, yellow, green, and blue, etc., each of which holds specific symbolic meanings in traditional Chinese culture.

Table 1. Analysis of Cultural External Layers in Qianci

Motif	Form	Color	Craftsmanship	Composition
Loongs Playing with Pearls	Two loongs spiraling on both sides with a plump pearl in the center	Primarily Green, complemented by vibrant red, yellow, and blue tones	3D inlay	Symmetrical arrangement of the loongs with the pearl as the focal point
Peony Blossoms	Fully blooming flowers with abundant stamens and lush branches	Primarily red, paired with bright white, pink, yellow, orange, and green colors	Flat inlay, relief inlay	Flowers scattered or concentrated, arranged according to space and location
Ao Fish with Scroll Grass	Ao fish spitting scroll grass, surrounded by additional scroll grass and floral motifs	Dominantly orange, accented with vibrant blue, yellow, red, white, and green colors	Relief inlay, 3D inlay	Symmetrical or asymmetrical composition, arranging scroll grass and flowers based on space and location
Sanxing (Deities)	Sanxing dressed in splendid attire, overflowing with joyous blessings	Blue as the base color, complemented by auspicious yellow, green, and red colors	3D inlay, relief inlay, flat inlay	Three deities arranged in a triangular or compact formation, reflecting stability, balance, and harmony

Table 2. Analysis of Cultural Internal Layers in Qianci

Motif	Symbolic Meaning	Ideological Consciousness	Religious Beliefs	Moral Ethics
Loongs Playing with Pearls	Nobility, auspiciousness, power, wealth, wisdom	Social status, wealth, wisdom, expectations for good fortune and national prosperity	Commonly found in temples and ancestral halls, reflecting the deification and reverence of loongs	Awe and loyalty, embodying the maintenance of social order and harmony
Peony Blossoms	Prosperity, glory, beauty, elegance	Aspiration and praise for wealth and honor, expectations and prayers for a beautiful life	Commonly seen in residential buildings and ancestral halls, reflecting the love and respect for flowers	Nobility, elegance, kindness, gentleness, reflecting harmony with nature and humanistic sentiments
Ao Fish with Scroll Grass	Valor, strength, resilience, vitality, prosperity, eternity, maritime culture	Praise and admiration for courageous and strong qualities, belief in vibrant vitality	Commonly found in temples and ancestral halls, reflecting the deification and reverence of Ao fish	Bravery, perseverance, struggle, progress, reflecting the recognition of maritime culture and Chaoshan characteristics
Sanxing (Deities)	Happiness, prosperity, longevity, fame, and wealth	Pursuit and prayer for a state of good fortune, prosperity, and longevity, expressing reverence for immortals	Commonly seen in temples and ancestral halls, representing traditional folk beliefs of the local people	Benevolence, righteousness, propriety, wisdom, trustworthiness, filial piety, reflecting ancestral worship and blessings for future generations

Internal Cultural Layer refers to the deeper, implicit meanings or symbolic connotations carried by symbols. It is the core of culture, embodying the soul and spirit of culture, the value orientation and way of thinking, as well as the creativity and innovation of culture (Liu *et al.* 2024). Behind graphic symbols, the internal layer encompasses the implicit meanings of the cultural connotations represented by symbols, including symbolic metaphors, ideological consciousness, religious beliefs, and moral ethics, forming the essential content of Qianci symbols (Table 2). Various patterns in Qianci art, such as loongs and phoenixes, flowers and birds, landscapes, and human figures, contain profound cultural connotations. They not only depict nature and society but also express ideals and emotions. These patterns are not only a continuation of tradition and history but also an exploration of innovation and transformation. To better analyze Qianci symbol patterns, four representative motifs Loongs Playing with Pearls, Peony Blossoms, Ao Fish with Scroll Grass, and Sanxing (Deities)—were initially selected through preliminary screening, showcasing the unique cultural connotations of the region.

Through the analysis of the external and internal layers of Qianci cultural symbols, the dual value of Qianci symbols in artistic expression and cultural heritage can be summarized. From the external layer, these symbols demonstrate a high degree of formal aesthetics and design logic through their forms, colors, craftsmanship, and compositions, exemplifying the combination of visual art and practical craft. From the internal layer, the symbols not only carry cultural connotations, but they also reflect social values, ideological consciousness, and regional characteristics. The motifs represented by Loongs Playing with Pearls, Peony Blossoms, Ao Fish with Scroll Grass, and Sanxing (Deities) not only embody the continuation of traditional culture in Qianci art but also provide inspiration for the application of cultural symbols in modern furniture design through their intrinsic meanings and aesthetic expressions. The in-depth interpretation of symbolic semantics provides a theoretical foundation for the modernization and design innovation of Qianci motifs, while also showcasing the value and potential of ICH in contemporary design practices.

Build User Demand Hierarchical Analysis Model

Based on a systematic analysis of the symbolic semantics of Qianci symbols, this study approached both the external cultural layers (form, color, craftsmanship, composition) and the internal cultural layers (symbolic meanings, ideological consciousness, religious beliefs, moral ethics) of the symbols. Through the extraction and analysis of symbolic semantics, a hierarchical structure model based on the AHP was constructed. The model sets “achieving the effective integration of ICH symbols into furniture design” as the goal layer, and refines the criteria into specific sub-criteria across three levels: **aesthetic requirements**, **cultural requirements**, and **market adaptability requirements**. This framework allows for a quantitative analysis of the priority of ICH symbols in furniture design (Fig. 5).

Construct Judgment Matrix

To establish a foundation for pairwise comparisons, the judgment matrix $A = [a_{ij}]_{n \times n}$, where a_{ij} is defined as follows, see Eq.1,

$$a_{ij} = \begin{cases} 1, & \text{if } i = j \\ \text{relative importance,} & \text{if } i \neq j \end{cases} \quad (1)$$

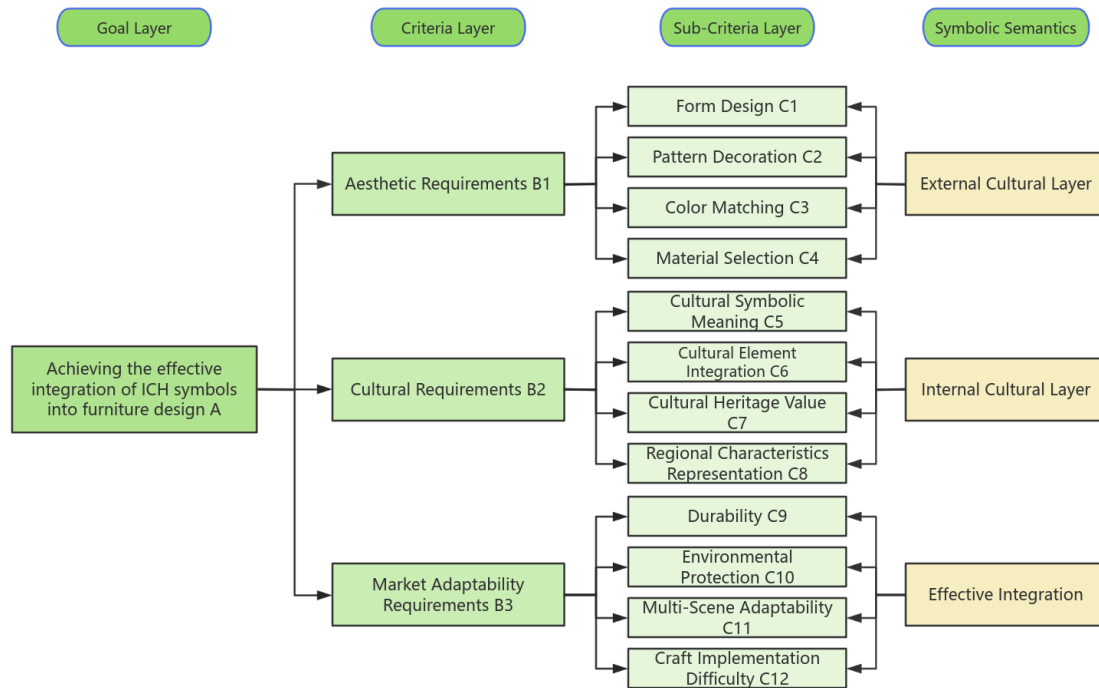


Fig. 5. Hierarchical structure diagram of effective integration of ICH symbols in furniture design

To determine the relative importance between factors, the Saaty 1–9 scale is applied, as shown in Table 3.

Table 3. Saaty 1–9 Scale

Value	Meaning
1	Two factors are equally important
3	One factor is slightly more important than the other
5	One factor is significantly more important than the other
7	One factor is very strongly more important than the other
9	One factor is extremely more important than the other
2, 4, 6, 8	Intermediate values between the above levels of importance
* Reciprocal values if inverse comparisons, i.e., $a_{ij} = 1/a_{ji}$	

The scale provides a systematic and consistent method to quantify judgments regarding the importance of criteria or sub-criteria (Taghavi *et al.* 2023). The constructed judgment matrix ensures that subjective evaluations are logically organized for further calculations.

Calculate Weight Vector

For robust, unbiased data collection, this study invited 40 representatives from diverse fields: 5 Qianci experts, 5 furniture designers, 10 ICH enthusiasts, 10 local residents, and 10 potential consumers. These participants evaluated the integration of embedded ceramic symbols in furniture design using a 1 to 9 scale. Their collective insights ensured a comprehensive assessment of the proposed designs, reflecting both professional perspectives and user preferences. The results are presented in Tables 4 through 7, and the calculation method is detailed as follows :

Step 1: Calculate the n^{th} Root of the Product of Each Row in the Judgment Matrix A , see Eq. 2.

$$M_i = \sqrt[n]{\prod_{j=1}^n a_{ij}} \quad (2)$$

where a_{ij} is the element in the i^{th} row and j^{th} column of the judgment matrix A , n is the dimension of the matrix.

Step 2: Normalize M_i to obtain the weight vector, see Eq. 3.

$$W_i = \frac{M_i}{\sum_{i=1}^n M_i} \quad (3)$$

Here, W_i represents the normalized weight vector, ensuring that all weights sum up to 1.

Step 3: Calculate the maximum eigenvalue of the judgment matrix, see Eq.4.

$$\lambda_{\max} = \sum_{i=1}^n \frac{(AW)_i}{nW_i} \quad (4)$$

where $(AW)_i$ is the i^{th} element of the product of the judgment matrix A and the weight vector W , W_i is the i^{th} weight in the weight vector, and n is the dimension of the matrix.

Table 4. Criteria Layer Judgment Matrix and Weight Vector

A	B ₁	B ₂	B ₃	W _A
B ₁	1	1/2	3	0.320
B ₂	2	1	4	0.558
B ₃	1/3	1/4	1	0.122

Table 5. Judgment Matrix and Weight Vector for Sub-Criteria B₁

B ₁	C ₁	C ₂	C ₃	C ₄	W _{B1}
C ₁	1	3	4	5	0.545
C ₂	1/3	1	2	3	0.233
C ₃	1/4	1/2	1	2	0.138
C ₄	1/5	1/3	1/2	1	0.084

Table 6. Judgment Matrix and Weight Vector for Sub-Criteria B₂

B ₂	C ₅	C ₆	C ₇	C ₈	W _{B2}
C ₅	1	4	4	6	0.567
C ₆	1/4	1	4	4	0.256
C ₇	1/4	1/4	1	2	0.108
C ₈	1/6	1/4	1/2	1	0.069

Table 7. Judgment Matrix and Weight Vector for Sub-Criteria B₃

B ₃	C ₉	C ₁₀	C ₁₁	C ₁₂	W _{B3}
C ₉	1	1/3	1/3	3	0.150
C ₁₀	3	1	3	5	0.513
C ₁₁	3	1/3	1	3	0.261
C ₁₂	1/3	1/5	1/3	1	0.076

Consistency Check

In the AHP, consistency check is a critical step to ensure the logical consistency of the judgment matrix. By calculating the CI and CR, the pairwise comparisons can be validated for their reasonableness. When $CR < 0.1$, the judgment matrix is considered to have satisfactory consistency and can be used for subsequent weight calculations. If $CR \geq 0.1$, then the pairwise comparisons need to be adjusted to improve consistency. The formulas for CI and CR are as follows:

The Consistency Index CI is calculated using Eq. 5, and the Consistency Ratio CR is calculated by means of Eq. 6.

$$CI = \frac{\lambda_{\max} - n}{n - 1} \quad (5)$$

$$CR = \frac{CI}{RI} \quad (6)$$

When $CR < 0.1$, the judgment matrix is considered consistent, indicating that the pairwise comparisons are logically sound. Based on the calculations, the consistency checks for all layers of the judgment matrices were passed. Detailed results are shown in Table 8.

Table 8. Consistency Test Results for Criteria and Sub-Criteria Layers

	$\lambda_{\max}$	CI	RI	CR	Consistency Result
A	3.018	0.009	0.525	0.017	pass
B ₁	4.051	0.017	0.882	0.019	pass
B ₂	4.222	0.074	0.882	0.084	pass
B ₃	4.198	0.066	0.882	0.075	pass

Comprehensive Weight Ranking

Calculate the overall weight of each sub-criterion relative to the target goal see Eq.7,

$$W_{\text{total}} = W_{\text{criterion}} \times W_{\text{subcriterion}} \quad (7)$$

The comprehensive weight analysis results indicate that C5 (Cultural Symbolic Meaning) holds the highest weight, emphasizing the importance of highlighting the cultural symbolic meaning of Qianci symbols in furniture design. C1 (Form Design) and C6 (Cultural Element Integration) rank second and third respectively, showcasing the significance of innovative form design and cultural element integration in enhancing product competitiveness and cultural value. C2 (Pattern Decoration) and C10 (Environmental Protection) are ranked fourth and fifth, reflecting the visual aesthetic of pattern decoration and the practical importance of environmental considerations in product design.

C7 (Cultural Heritage Value) ranks sixth, underscoring its role in representing cultural heritage. Other criteria, such as C3 (Color Matching), C8 (Regional Characteristics Representation), and C11 (Multi-Scene Adaptability), are ranked seventh, eighth, and ninth, respectively, and they still hold certain reference value in specific design scenarios. C4 (Material Selection), C9 (Durability), and C12 (Craft Implementation Difficulty), are ranked tenth, eleventh, and twelfth, respectively, but they may still offer insights depending on the specific design requirements (Table 9).

Table 9. Comprehensive Weight Analysis Results

Sub-criteria	Criteria Weights	Sub-criteria weights	Comprehensive weights	Ranking
C ₁	0.320	0.545	0.174	2
C ₂		0.233	0.075	4
C ₃		0.138	0.044	7
C ₄		0.084	0.027	10
C ₅	0.558	0.567	0.316	1
C ₆		0.256	0.143	3
C ₇		0.108	0.060	6
C ₈		0.069	0.039	8
C ₉	0.122	0.150	0.018	11
C ₁₀		0.513	0.063	5
C ₁₁		0.261	0.032	9
C ₁₂		0.076	0.009	12

Design Practice

The analysis identifies six key design indicators: cultural symbolic meaning, form design, cultural element integration, Pattern Decoration, environmental protection, and cultural heritage value. These indicators establish a robust framework for guiding the innovative application of Qianci symbols in contemporary furniture design, bridging cultural heritage with modern aesthetics.

Based on this foundation, Adobe Illustrator was employed for the digital extraction and processing of graphical elements from Qianci motifs. The Peony blossoms and Ao Fish with Scroll Grass motifs were selected as core elements due to their rich symbolic connotations and distinct artistic characteristics. The selection was guided by their alignment with the six design indicators and their adaptability to modern furniture design.

The Peony blossoms motif was abstracted and transformed to emphasize its cultural essence while ensuring compatibility with the furniture's structure. The Ao Fish with Scroll Grass motif was similarly deconstructed to capture its dynamic forms and unique marine cultural significance. These motifs were not directly replicated but reinterpreted through a design process that balanced cultural symbolism with modern design principles.

By translating traditional craftsmanship into modern design language, these two motifs were reconstructed to showcase elegant forms and artistic expressiveness. This approach integrates their cultural depth with aesthetic innovation, contributing to the creation of furniture pieces that blend cultural heritage with contemporary value (Fig. 6). The Peony blossoms-Themed Lamp-Hanger Chair embodies the design philosophy of "wealth and elegance" by integrating symbolic elements of the peony, such as petals, stamens, and the overall flower shape, into a harmonious pattern system. The petal patterns are skillfully incorporated into the Top rail and Humpbacked stretcher, extending the chair's structure with graceful curves and enhancing its decorative and artistic appeal. The hollow-out design of the full peony blossom motif aligns seamlessly with the Back of chair, creating a visually striking focal point that reflects the opulence and ceremonial significance of the design. The stamen patterns are applied as refined embellishments on select sections of the Humpbacked stretcher, adding intricate details and ensuring overall cohesion. This use of hollow-out craftsmanship accentuates the cultural significance of the peony, imbuing the chair with elegance and sophistication.



Fig. 6. Extraction of Qianci pattern elements

The Ao Fish with Scroll Grass-Themed Lamp-Hanger Chair is inspired by the concept of “dynamism and vitality,” symbolizing Chaoshan’s marine culture while incorporating modern design aesthetics. The horns, tails, and scroll grass patterns of the Ao fish were digitally extracted and reconfigured into a symmetrical and dynamic decorative language. The scroll grass motifs are integrated into the Back of chair through relief craftsmanship, creating flowing decorative lines that enhance the chair’s elegance. The Ao fish horns are incorporated into the Top rail and Humpbacked stretcher as extendable decorative elements, enriching the furniture’s cultural depth. Meanwhile, the Ao fish tails are seamlessly blended into the Humpbacked stretcher patterns, using intricate details to emphasize structural dynamism and balance. To achieve the relief effect, the patterns are carved from leftover wood materials and adhered to the furniture surface, effectively minimizing material waste while showcasing the intricate craftsmanship. This sustainable approach aligns with the principles of eco-friendly design and highlights the adaptability of traditional craftsmanship to modern design needs. Relief techniques meticulously present these patterns, conveying the cultural meanings of bravery, vitality, and prosperity, while demonstrating the innovative application of Chaoshan’s intangible cultural heritage symbols in modern furniture design.

Both chairs are rooted in symbolic semantics, ensuring the seamless integration of cultural symbols into functional and aesthetic furniture designs. To meet environmental protection standards, sustainable wood and low-VOC (volatile organic compounds) paints were used, emphasizing eco-friendly attributes. Through the use of modern design language, these works achieve a harmonious blend of cultural depth and contemporary aesthetics.

These designs not only reflect the cultural symbolic meaning, form design, cultural element integration, Pattern Decoration, environmental protection, and cultural heritage value as key design indicators, but they also exemplify the adaptability of intangible cultural heritage symbols, highlighting their potential for diverse applications and sustainable value in modern furniture design (Fig. 7).

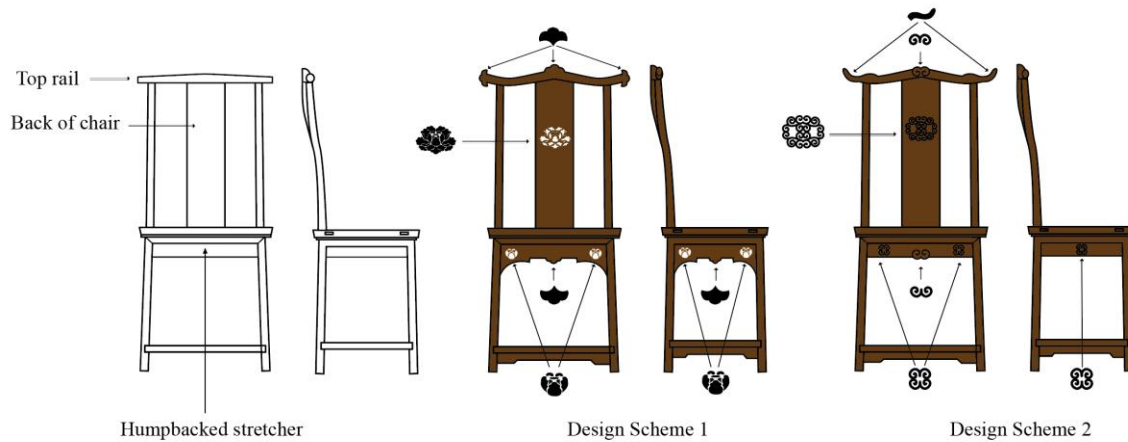


Fig. 7. Furniture design scheme with IHC Qianci elements

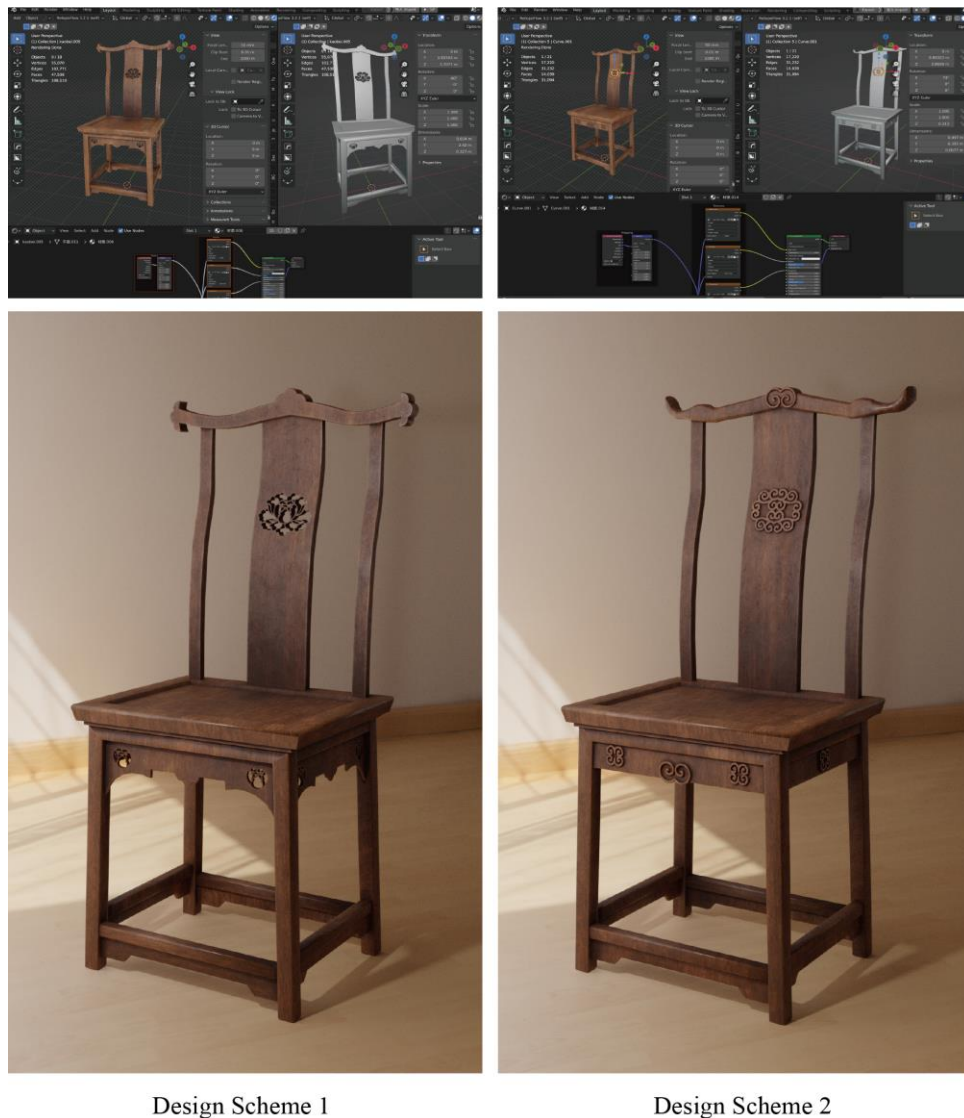


Fig. 8. Modeling and effects of furniture with IHC Qianci elements

To further optimize the design effect and presentation of the lamp-hanger chair, Blender software was utilized for 3D modeling and rendering. This process refined and showcased the chair's overall structure, intricate patterns, and color coordination, achieving a highly realistic 3D visual representation (Fig. 8). The 3D modeling accurately reproduced the lamp-hanger chair's design features, while the rendering emphasized the details of the patterns and material textures, making the aesthetic and functional aspects of the design more intuitively displayed (Sommer *et al.* 2024). Additionally, using Blender's multi-node functionality and material processing tools, texture mapping and lighting simulations were applied to the model, further enhancing the design's artistic expressiveness and technical feasibility.

Product Evaluation

In order to systematically evaluate the two proposed lamp-hanger chair designs, an expert panel of 5 Qianci artisans, 5 furniture designers, and 10 potential furniture consumers were recruited. The purpose of including these three groups was to ensure a balanced perspective, combining specialized craftsmanship knowledge (artisans), professional design insights (furniture designers), and market-based consumer viewpoints (potential buyers).

The evaluation process was designed to measure five key dimensions: Cultural Symbolic Meaning (C₁), Form Design (C₂), Cultural Element Integration (C₃), Pattern Decoration (C₄), and Environmental Protection (C₅). Each dimension was rated on a 5-point Likert scale, where 1 indicated "very poor" or "strongly disagree," and 5 indicated "excellent" or "strongly agree."

Participants were provided with a standardized reference sheet that detailed the criteria for each dimension. To ensure the design meets standards, evaluation criteria were set as follows: average score for each dimension ≥ 4.4 , overall average score ≥ 4.5 , standard deviation ≤ 1 . C₁ assessed the extent to which the design captured and conveyed relevant cultural motifs or symbolic elements. C₂ evaluated the aesthetic harmony, structural innovation, and overall ergonomics of the design's form. C₃ focused on the balance and cohesion of traditional motifs, ensuring they were neither too fragmented nor overly modernized. C₄ examined the artistry, detailing, and overall execution of decorative patterns. Lastly, C₅ assessed the design's environmental protection by focusing on the use of eco-friendly, efficient production processes, and overall sustainability.

After collecting the completed forms from all 20 participants, a total of 20 valid questionnaires were obtained. For each dimension, the average score and standard deviation were calculated separately for the two design schemes (Design Scheme 1 and Design Scheme 2).

The evaluation results indicate that both design proposals achieved excellent levels (average score for each dimension ≥ 4.4 , overall average score ≥ 4.5 , standard deviation ≤ 1) (Fig. 9). The Peony blossoms-Themed Lamp-Hanger Chair particularly excelled in cultural symbolic meaning and pattern decoration, showcasing an elegant and grand overall style. The Ao Fish with Scroll Grass-Themed Lamp-Hanger Chair stood out in form design, cultural element integration and environmental protection, presenting a stronger sense of dynamism and cultural tension.

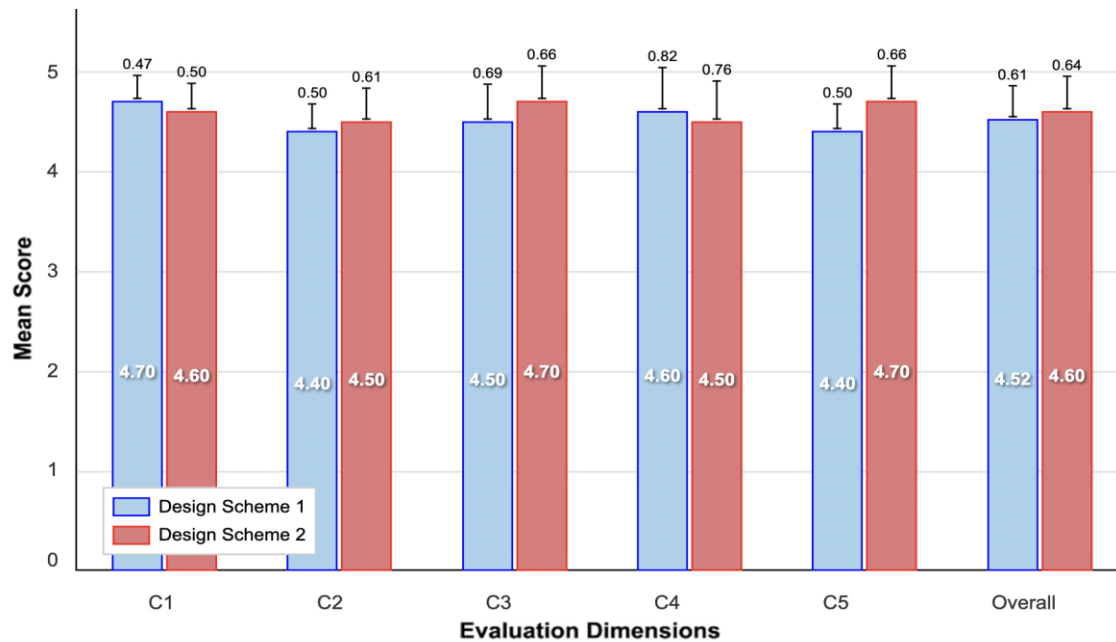


Fig. 9. Comparison of mean scores and standard deviations between two design schemes

CONCLUSIONS

1. Through symbolic semantics analysis, this study conducted a systematic examination of Qianci cultural symbols, deeply revealing their dual value in both the external cultural layers (form, color, craftsmanship, composition) and the internal cultural layers (symbolic meaning, ideological consciousness, religious beliefs, moral ethics). These symbols not only carry profound cultural connotations but also exhibit significant aesthetic characteristics, providing rich creative inspiration and cultural resources for modern furniture design.
2. Based on the weight analysis of the symbolic semantics and AHP model, the study quantified the importance ranking of Qianci symbols in furniture design. The results show that cultural symbolic meaning, form design, cultural element integration, pattern decoration, environmental protection and cultural heritage value are key indicators in furniture design. This analysis provides a scientific basis for the modern application of intangible cultural heritage in design and clarifies the core directions for cultural element translation and innovation.
3. Combining symbolic semantics with the AHP model analysis and employing modern design techniques, two thematic furniture design proposals were completed. The evaluation results demonstrate that both design proposals achieved excellent levels, further proving the innovative potential and application value of Qianci symbols in modern furniture design. This research offers new ideas for the revitalization and utilization of intangible cultural heritage, promoting the diversification and sustainable development of furniture design.

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