

Enhancing Product Design Value through Tang Dynasty Bohai Tribe Cultural Heritage Artifacts in the Bohai Shangjing Museum, People's Republic of China

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This study explores the integration of cultural heritage artifacts from the Tang Dynasty Bohai Tribe, housed in the Bohai Shangjing Ruins Museum, into modern product design to enhance design value. The Bohai Kingdom, a significant regional power in Northeast Asia during the Tang Dynasty, boasts a rich cultural heritage characterized by the fusion of Central Plains culture and indigenous Northeast Asian traditions. However, its cultural legacy remains underrepresented in contemporary cultural and creative (CC) product markets, with existing offerings suffering from homogeneity, superficial cultural engagement, and limited market appeal.

Through a mixed-methods research approach encompassing literature review, case studies, fieldwork, expert interviews, and questionnaire surveys, this study identifies core cultural elements of Bohai artifacts—including architectural motifs, artistic patterns, craftsmanship techniques, and symbolic meanings. Drawing on semiotic theory, artistic theory, and cultural stratification theory, the research develops a framework for transforming these cultural elements into innovative design solutions. The study evaluates the effectiveness of cultural integration, innovative transformation, and dissemination in CC product design, aiming to provide actionable strategies for the Bohai Shangjing Ruins Museum to develop distinctive, culturally resonant products.

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Findings reveal that successful CC product design must balance historical authenticity with modern functionality and aesthetic preferences, leveraging digital technologies and cross-border collaborations to expand reach. By excavating the deep

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cultural connotations of Bohai artifacts and adopting user-centric design principles, museums can create CC products that serve as both cultural communication vehicles and economic drivers, fostering greater public awareness and preservation of Bohai cultural heritage.

Keywords: Bohai Tribe; Cultural Heritage; Product Design; Museum Cultural and Creative Products; Tang Dynasty; Cultural Integration

Introduction

1.1 Background

1.1.1 Bohai Ethnic Cultural and Historical Background

The Bohai Kingdom (698–926 AD) stands as the first documented political entity within present-day Heilongjiang Province, Northeast China. Established by the Mohe people—ancestors of the Manchu ethnic group—and enfeoffed by the Tang Dynasty, it emerged as a powerful regional minority regime that thrived for over two centuries (Huang Danian, 1999). Shangjing Longquanfu, its primary capital, witnessed the kingdom's rise as the "Prosperous Kingdom of the East Sea" and the integration of Sushen, Mohe, and other ethnic groups into the Chinese nation, embodying the unity and diversity of Chinese civilization (Feng Lijuan, 2010).

Designated a national key cultural relic protection site in 1961, the Shangjing ruins represent the best-preserved medieval capital site in China, offering unparalleled insights into urban planning, architecture, and social life of the period. Unlike the capitals of the Tang and Song dynasties, which are largely obscured by modern urban development, the Shangjing ruins retain intact structural layouts both within and outside the city walls, making them a site of immense scientific and academic value (Yang Yushu, 2021).

Archaeological research indicates that Bohai's capital construction emulated Sui-Tang systems while adapting to local conditions, resulting in unique architectural forms that enriched Chinese architectural history. The kingdom's cultural achievements were equally

remarkable: Buddhism flourished, leaving behind Buddhist statues, relic caskets, and temple ruins; inscriptions on tile ends, seals, and steles attest to cultural exchanges with the Tang Dynasty; and artifacts such as pottery, bronzeware, and tri-colored (sancai) vessels demonstrate exquisite craftsmanship blending practicality and aesthetics (Gou Haiyan, 2021). At its zenith, Bohai's territory spanned present-day Heilongjiang, Jilin, and Liaoning provinces in China, Russia's Primorsky Krai, and parts of northern Korea, serving as a crucial bridge for cultural exchange between China, Japan, Silla, and other Northeast Asian states (Huang Danian, 1999).

1.1.2 Bohai Shangjing Ruins Museum

Located in Bohai Town, Ning'an City, Heilongjiang Province, the Bohai Shangjing Ruins Museum was established in 1985 to preserve, research, and exhibit the Shangjing ruins and its unearthed artifacts (Wang Chunhui, 2017). Housed in a reconstructed five-story hall of the Qing Dynasty Xinglong Temple, the museum currently features four exhibition rooms displaying over 200 Bohai artifacts, with a total collection of 451 cultural relics—primarily architectural materials (e.g., roof tiles, decorative bricks) and Buddhist ritual objects. A new museum complex, under planning, will cover 60,000 square meters, including exhibition halls, a simulated imperial garden, and a miniature Tang-style palace, to better showcase Bohai culture.

Bohai artifacts in the museum's collection reflect the kingdom's advanced craftsmanship: ceramics (divided into unglazed pottery, glazed pottery, and porcelain) were used for daily life and architectural decoration, with glazed pottery

technology exported to Japan and favored by the Japanese elite; metallurgical artifacts, including gold, silver, and ironworks, demonstrate sophisticated mining, smelting, and processing techniques (Sun Xiaobin, 2023). Notable pieces include the tri-color animal head (a decorative component of palace ridges), the nine-tiered relic casket (reflecting religious ties with the Tang Dynasty), and the "Tianmen Army Seal" (exemplifying Tang-influenced seal-making techniques) (Li Peng, 2020; Zhao Zhencheng, 2024).

Despite its cultural significance, the Bohai Kingdom remains relatively obscure to the general public. Its history and heritage urgently require innovative dissemination methods to raise awareness and foster appreciation. For the Bohai Shangjing Ruins Museum, developing distinctive CC products offers a viable solution: by translating the museum's unique cultural connotations into tangible, marketable products, it can enhance cultural visibility, generate revenue, and promote heritage preservation (Zeng Li & Xiang Yanci, 2025).

1.1.3 Cultural and Creative Products of the Bohai Shangjing Ruins Museum

China's museum CC industry has experienced rapid growth in recent years, with institutions such as the Palace Museum, Sanxingdui Museum, and Shaanxi History Museum gaining widespread acclaim for their innovative products. However, the sector faces systemic challenges, including product homogeneity, superficial cultural engagement, and inadequate integration of traditional elements with modern design (Tan Jigong, 2024).

The Bohai Shangjing Ruins Museum's CC product development is still in its nascent stage. Current offerings are limited in variety, with most products (e.g., refrigerator magnets, keychains) featuring generic designs inspired by Tang Dynasty ladies or the museum's exterior architecture. These products lack authentic Bohai cultural identity, suffer from crude craftsmanship, and fail to deliver meaningful functional or aesthetic value (Wang Chunhui, 2017). To address these gaps, there is an urgent need to explore

creative transformation paths that align with Bohai's historical spirit, leveraging its unique cultural values and artistic characteristics to achieve both cultural dissemination and economic sustainability.

1.2 Research Questions

How can core cultural elements of the Tang Dynasty Bohai Tribe—reflected in artifacts of the Bohai Shangjing Ruins Museum—be identified and extracted for CC product design?

How can these cultural elements be innovatively integrated into CC product design to balance historical authenticity, modern functionality, and market appeal?

What strategies can enhance the dissemination effectiveness and market performance of Bohai-themed CC products, contributing to cultural heritage preservation and museum development?

1.3 Research Objectives

Analyze the cultural and historical background of the Tang Dynasty Bohai Tribe and the cultural value of artifacts in the Bohai Shangjing Ruins Museum.

Identify core cultural elements of Bohai artifacts (e.g., patterns, materials, craftsmanship, symbols) and their potential for CC product design.

Develop a framework for integrating Bohai cultural elements into CC product design, guided by theoretical perspectives (semiotic theory, artistic theory, cultural stratification theory).

Evaluate the effectiveness of cultural integration and innovative transformation through expert interviews and consumer surveys, providing actionable recommendations for the museum.

1.4 Research Scope

Time Scope: Focuses on the Tang Dynasty (618–907 AD), encompassing the historical period of the Bohai Kingdom (698–926 AD) and its cultural and artistic expressions.

Geographical Scope: Centered on the

Bohai Shangjing Ruins Museum and the Shangjing Longquanfu ruins in Ning'an City, Heilongjiang Province. Supplementary research may extend to other Bohai-related sites or museums to ensure a comprehensive understanding of Bohai culture.

Thematic Scope: Analyzes the cultural connotations of Bohai artifacts (including architectural materials, ritual objects, daily necessities, and artworks) in the museum's collection, focusing on their craftsmanship, patterns, materials, functions, and symbolic meanings. Explores the application of these elements in modern CC product design.

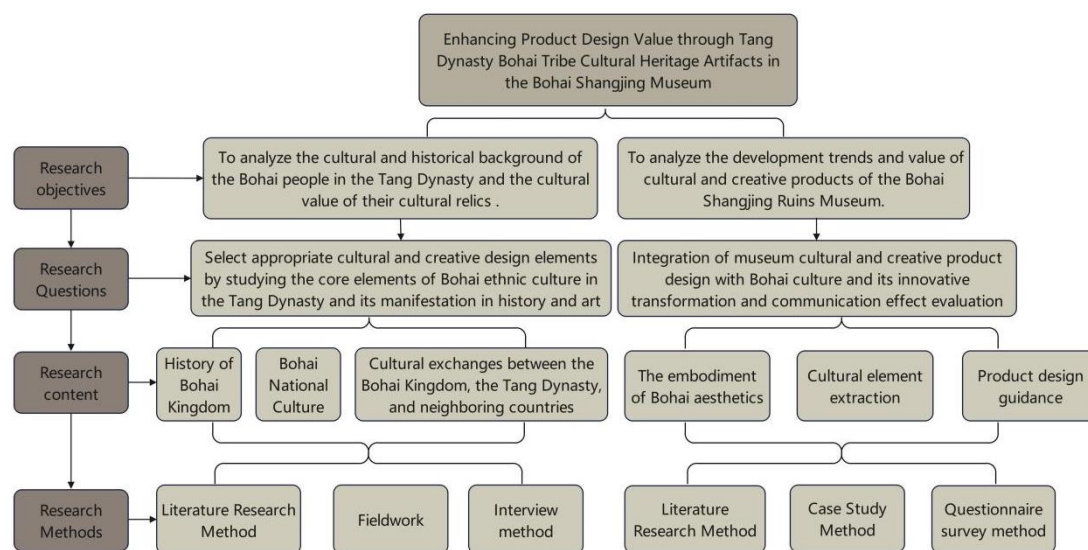
Literature Scope: Covers academic works on Bohai history and culture from the 1930s (e.g., Jin Yufu's *A Complete History of the Bohai Kingdom*)

to recent studies (e.g., Peng Shanguo's *Research on Cultural Relics of the Bohai Kingdom*, 2023), as well as research on museum CC product design.

1.5 Research Framework

This study adopts a multi-dimensional research framework integrating literature review, case studies, fieldwork, expert interviews, and questionnaire surveys (Figure 1). The framework consists of four phases: (1) theoretical foundation building through literature review and theoretical analysis; (2) cultural element extraction via fieldwork and artifact analysis; (3) design framework development based on case studies and theoretical integration; (4) validation and evaluation through expert interviews and consumer surveys

Figure 1 Research Framework



(Source: Drawn by the author)

1.6 Definition of Terms

Tang Dynasty Bohai Culture: A unique cultural system formed between the 7th and 10th centuries AD, integrating Mohe traditions with Tang Dynasty Central Plains culture, Khitan, and Goguryeo influences. It encompasses historical, cultural, artistic, social, and practical values, reflecting both inheritance of Chinese traditions and independent innovation.

Bohai Shangjing Ruins Museum: An

institution dedicated to preserving, researching, and showcasing the history and culture of the Bohai Kingdom, located on the site of Shangjing Longquanfu. Its collection and exhibitions present the political, economic, cultural, and social life of Bohai.

Museum CC Design Value: The value derived from transforming cultural resources and historical-artistic elements into creative products, encompassing cultural dissemination, educational promotion, economic benefits, and social impact.

It enhances cultural heritage revitalization, museum appeal, and cultural soft power.

Bohai Aesthetics: An aesthetic system formed by the Bohai Kingdom through cultural integration, based on Mohe culture and incorporating Tang Dynasty Central Plains, Khitan, and Goguryeo artistic styles. It emphasizes form-function unity, harmony between nature and humanity, and is reflected in architecture, sculpture, painting, clothing, and artifacts.

Semiotic Theory: A theoretical framework focusing on the relationship between symbols and meaning, emphasizing that cultural symbol meaning is derived from shared coding systems and contexts. It provides methods for interpreting and redesigning Bohai cultural relic symbols to avoid superficial understanding.

Artistic Theory: Focuses on the transformation of design and cultural value,

emphasizing the connection between art and life. It helps reveal the cultural value of Bohai artifacts and guide their modern transformation through design practice.

Cultural Stratification Theory: Divides culture into material, behavioral, institutional, and spiritual layers, providing a multidimensional perspective for understanding Bohai culture and broadening design resources beyond elitist culture.

Literature Review

2.1 Research on the History and Culture of the Bohai Kingdom

Scholarly research on Bohai history and culture has a long tradition, with key works spanning from the 1930s to the present (Table 1). These studies cover historical origins, cultural characteristics, material culture, and international exchanges.

Table 1

Key Works on Bohai Kingdom History and Culture

Book Title	Author	Publication Date
<i>A Complete History of the Bohai Kingdom</i>	Jin Yufu	1934–1935
<i>Bohai Kingdom Relics</i>	Zhu Guochen/Zhu Wei	2002
<i>Research on Bohai Culture: From the Perspective of Archaeological Discoveries</i>	Liu Xiaodong	2006
<i>History of the Bohai Kingdom</i>	Wei Guozhong/Yang Yushu	2019
<i>Research on Cultural Relics of the Bohai Kingdom</i>	Peng Shanguo	2023
(Source: Compiled by the author)		

Historical and Cultural Characteristics

Bohai's cultural characteristics are defined by duality: as a local regime established by the Mohe people (and incorporating Goryeo remnants) and a vassal state of the Tang Dynasty,

it deeply fused Central Plains culture with indigenous Northeast Asian traditions (Feng Lijuan, 2010; Huang Danian, 1999). The kingdom's identification with Chinese culture evolved through four stages: initial political dependence and cultural engagement;

comprehensive learning and institutional imitation; cultural integration and ethnic identification; and cultural inheritance (Xin Zhifeng, 2025). Bohai absorbed Tang's political systems, rituals, and arts while preserving Mohe social structures and customs, laying the foundation for its role as a cultural exchange hub in Northeast Asia (Huang Danian, 1999).

2.1.1 Material Culture Research

Material cultural relics provide crucial evidence for understanding Bohai's social system and cultural characteristics. Key research focuses include:

Roof Tiles and Inscriptions: Bohai roof tiles feature Tang-influenced patterns (e.g., lotus, grass motifs) and inscriptions that serve as "trademarks" for artisans, reflecting advanced craftsmanship and character culture continuation (Sun Xiaobin, 2023; Zhao Zhencheng, 2024).

Architectural Materials: Baoxianghua (treasure flower) patterned bricks, a primary building material, exhibit intricate shallow relief designs with concentric circles and petal layers, reflecting religious and aesthetic values (Gou Haiyan, 2021).

Tri-colored Pottery: Bohai tri-colored pottery, similar to Tang sancai but with local characteristics, was used for decorative and ritual purposes. The tri-color animal head artifact, unearthed from the Shangjing ruins, is a museum treasure (Zhao Zhefu et al., 2003).

Religious Artifacts: The nine-tiered relic casket and bronze "Kunlun Slave" statues reflect religious exchanges with the Tang Dynasty, while the "Tianmen Army Seal" demonstrates Tang-influenced seal-making techniques (Li Peng, 2020; Ziyun, 1979).

Capital Layout: Shangjing Longquanfu emulated Tang Chang'an's urban planning while incorporating local features, providing insights into Bohai's political and economic center (Yang Yushu, 2021).

2.1.2 Bilateral Cultural Exchanges

Bohai was an open kingdom, serving as a bridge for cultural exchange between the Tang

Dynasty and Northeast Asian states (Japan, Silla, Khitan). Diplomatic and cultural interactions with the Tang facilitated Sinicization, while Bohai's cultural achievements (e.g., Buddhism, calligraphy, music) were disseminated to neighboring regions (Huang Danian, 1999). Archaeological collaborations, such as the 1939 Japanese excavation report and 1963–1964 Sino-North Korean joint excavations, have contributed to understanding Bohai's role in regional cultural integration (Pei Hongshan, 2009; Yu Fuye & Liu Jia, 2024).

2.1.3 Research Gaps and Future Directions

Existing research has made significant progress in archaeological excavation, artifact analysis, and historical interpretation but faces limitations: weak research on Bohai's internal social structure and economic model; slow integration of international research results; and insufficient application of interdisciplinary methods (Yang Yushu, 2021). Future research should strengthen interdisciplinary collaboration (e.g., GIS, chemical analysis), promote digital heritage preservation, and enhance international cooperation to adopt a global perspective on Bohai studies (Yu Shu & Sun Haijing, 2025).

2.2 Protection and Utilization of Bohai Cultural Heritage

2.2.1 Current Status of the Shangjing Ruins

The Shangjing ruins cover approximately 16.6 square kilometers, making them one of the largest surviving medieval urban sites. Despite policy support (e.g., national key cultural relic protection status, inclusion in national archaeological sites parks), the ruins face threats from natural erosion (wind, rain) and human activities (agricultural reclamation, unregulated tourism) (Wang Dongyang, 2012; Wang Chunhui, 2017). Basic protection measures, such as backfilling of key sites and museum preservation, lack systematic planning.

2.2.2 Problems in Heritage Protection

Insufficient Planning: Protection efforts focus on static preservation, ignoring integration

with the surrounding environment and dynamic cultural inheritance (Chen Qingbai, 1981; Lü Lihui, 2007).

Ruins Deterioration: Long-term natural erosion and historical human destruction (e.g., Khitan's burning of Shangjing) have damaged the ruins, with only partial city foundations, walls, and building remains intact (Wang Dongyang, 2012).

Limited Museum Functions: Museum exhibitions are incomplete and monotonous, failing to fully convey Bohai's cultural connotations and engage the public (Gou Haiyan, 2021).

Environmental Interference: Random greening, agricultural activities, and resident behavior disrupt the ruins' historical context (Chen Qingbai, 1981).

2.2.3 Protection and Utilization Strategies

Scholars propose holistic solutions: (1) integrated planning of the ruins and surrounding areas, dividing functional zones and optimizing transportation (Wang Chunhui, 2017); (2) cultural value continuation through modern technology (e.g., digital restoration, "before-and-after" comparison displays) (Chen Qingbai, 1981); (3) environmental optimization (e.g., historical vegetation planting, drainage systems) (Gou Haiyan, 2021); (4) museum improvement (e.g., enriching exhibits, developing CC products) (Gou Haiyan, 2021); and (5) public participation and education (e.g., thematic lectures, site parks) (Sun Yue et al., 2017).

2.3 Museum Cultural and Creative Product Design

2.3.1 Development Status and Challenges

Museum CC products have emerged as key vehicles for cultural dissemination and economic development, driven by policy support, technological innovation, and cultural confidence (Li Yinping, 2024). Successful cases include the Palace Museum's "Emperor Yongzheng Enjoys Pleasures" series and Xi'an Museum's "Tang

Xiaoxi" IP, which leverage cultural elements to create popular, marketable products (Tan Jigong, 2024; Li Yinping, 2024). However, the sector faces three major challenges:

Homogeneity: Most products are low-tech (e.g., bookmarks, refrigerator magnets) with superficial cultural engagement, lacking differentiation (Zeng Li & Xiang Yanci, 2025).

Insufficient Branding: Many museums lack long-term brand planning, limiting sustainable market competitiveness (Tan Jigong, 2024).

Weak Interdepartmental Collaboration: Shortages of specialized talent and technology hinder innovation, as CC product development requires collaboration across preservation, design, and marketing departments (Hu Xiujuan, 2024).

2.3.2 Cultural Element Extraction and Transformation

Effective CC product design relies on extracting and transforming cultural elements from museum collections. Key approaches include:

Pattern and Shape Extraction: Directly adapting representative patterns (e.g., Palace Museum's "Ice Playing" bookmarks) or shapes (e.g., Nanjing Museum's "Seven Sages of the Bamboo Grove" ambient lighting) (Zeng Li & Xiang Yanci, 2025; Wang Tingting, 2024).

Symbolic Interpretation: Using semiotic theory to decode cultural symbols (e.g., Natural History Museum's "Yellow River Elephant" products integrating morphological, semantic, and pragmatic elements) (Wang Yifan et al., 2024).

Cultural Stratification: Drawing on material, behavioral, institutional, and spiritual cultural layers to enrich design depth (e.g., Chengde Museum's "Eight Blessings Tea Set" integrating Qing Dynasty palace culture) (Guo Jiaqi, 2024).

2.3.3 Innovation Trends

Future CC product design is shaped by two key trends:

Digitalization: Technologies such as

AR/VR, 3D scanning, and metaverse applications enhance interactivity and immersion. Examples include Shanxi Museum's AR-enabled exhibits and Henan Museum's digital "Fuhao Owl Zun" collection (Duan Li, 2024; Yang Haoye, 2024).

Cross-border Collaboration: Partnerships between museums, technology companies, and fashion brands expand market reach. For example, Xi'an Museum's collaboration with Peak Sports and Chengde Museum's cross-border products with the National Palace Museum in Taipei (Li Yinping, 2024; Guo Jiaqi, 2024).

2.4 Theoretical Basis

2.4.1 Semiotic Theory

Umberto Eco's comprehensive semiotics (e.g., "cultural unit," "code," "infinite derivation") provides a framework for interpreting Bohai cultural relics beyond superficial symbols, emphasizing contextual and historical meaning (Eco, 1976). Ferdinand de Saussure's "signifier-signified" binary model enables deconstruction of artifact elements (e.g., lines, colors as signifiers; bravery, sacredness as signified) (Saussure, 1916).

2.4.2 Artistic Theory

Yin Dingbang's "Design Value Theory" (1993) guides the transformation of cultural potential value into tangible product value, emphasizing design practice orientation. Pan Lusheng's "folk arts" and "cultural ecology" theories highlight the local and original characteristics of Bohai culture, informing authentic design (Pan, 2006).

2.4.3 Cultural Stratification Theory

Pang Pu's "Four Structures Theory" (material, institutional, behavioral, spiritual layers) provides a multidimensional perspective for extracting cultural elements from Bohai artifacts, ensuring design depth and authenticity (Pang, 1987).

2.5 Related Research

Relevant studies provide theoretical and practical support for this research:

Duan Li (2024) analyzes digital trends in museum CC design, emphasizing interactivity and personalization.

Feng Lijuan (2010) explores Bohai's historical and cultural characteristics, laying the foundation for cultural element extraction.

Gou Haiyan (2021) appreciates Bohai artifacts, highlighting their artistic value and cultural exchange significance.

Wang Yifan et al. (2024) apply semiotic theory to natural history museum CC design, offering a model for cultural symbol transformation.

Zhang Xianfa (2024) examines the communication value of museum CC products, emphasizing their role in cultural soft power enhancement.

Research Methodology

3.1 Research Methods

This study adopts a mixed-methods approach combining qualitative and quantitative methods to ensure rigor and comprehensiveness:

3.1.1 Literature Review

Collects and analyzes domestic and foreign literature on Bohai history, cultural heritage protection, museum CC product design, and relevant theories (semiotics, artistic theory, cultural stratification). The literature scope includes academic books, journal articles, conference proceedings, and policy documents, covering the period from the 1930s to 2024. The goal is to establish a theoretical foundation, identify research gaps, and guide subsequent research phases.

3.1.2 Case Study Method

Selects representative museum CC product cases (domestic and international) based on criteria such as cultural value conversion, innovation, market performance, and communication effectiveness. Key cases include:

Domestic: Palace Museum (cultural symbol transformation), Sanxingdui Museum (digital CC products), Shaanxi History Museum (cross-

border collaborations).

International: British Museum (IP licensing), Louvre Museum (high-end design collaborations).

The study analyzes case design concepts, cultural element integration methods, and market strategies to extract transferable experiences for Bohai-themed CC product design.

3.1.3 Fieldwork

Conducts on-site investigations at the Bohai Shangjing Ruins Museum and surrounding cultural sites (e.g., Shangjing Longquanfu ruins, Ning'an Bohai Folk Customs Park) from June to August 2024. Key activities include:

Artifact Observation: Photographs and records artifacts (e.g., roof tiles, tri-colored pottery, bronze works) to document patterns, materials, craftsmanship, and symbolic features.

CC Product Audit: Evaluates existing CC

products for cultural relevance, design quality, and functionality.

On-site Interviews: Engages with museum staff, local residents, and tourists to gather insights into Bohai culture perception and CC product needs.

Data Collection: Collects museum publications, exhibit descriptions, and archaeological reports to supplement artifact analysis.

3.1.4 Expert Interviews

Selects 14 experts from four groups (Table 2) to conduct semi-structured interviews (30–60 minutes each) in September–October 2024. Interviewees are chosen for their expertise and experience (≥ 10 years in the field) to ensure authoritative insights. Interview questions focus on core Bohai cultural elements, CC product design principles, cultural-innovation balance, and market demand.

Table 2

Expert Interview Participants

Group	Number of Participants	Background	Interview Topics
Museum Staff	3	Director, curator, docent (Bohai Shangjing Ruins Museum)	Bohai cultural core values; existing CC product status; cultural dissemination needs
Bohai Culture Scholars	3	Experts from Mudanjiang Normal University Bohai Research Center	Bohai cultural uniqueness; representative elements; heritage-innovation balance
Cultural and Creative Designers	3	Graphic designers, design educators, graduate students	Cultural element transformation methods; modern design language integration; market trends
Consumers	5	CC product enthusiasts (25–50)	Bohai culture awareness; product

years old, diverse preferences;
occupations) purchasing
motivations

(Source: Compiled by
the author)

3.1.5 Questionnaire Survey

Designs a questionnaire to investigate museum visitors' and CC product consumers' perceptions, preferences, and needs. The questionnaire includes closed-ended (Likert scale, multiple choice) and open-ended questions, covering:

1. Demographic information (age, gender, occupation, education).
2. Bohai culture awareness and interest.
3. CC product purchasing habits and preferences (type, price, design features).
4. Acceptance of Bohai-themed CC products.

The questionnaire is distributed online (social media platforms: WeChat, Weibo) and offline (Bohai Shangjing Ruins Museum, cultural venues in Ning'an City) from November 2024 to January 2025. A total of 300 questionnaires are distributed, with 278 valid responses (response rate: 92.7%). Data is analyzed using SPSS 26.0 for descriptive statistics, correlation analysis, and regression analysis.

3.2 Research Tools and Procedures

3.2.1 Research Tools

Literature Management: Zotero for literature collection, categorization, and citation.

Data Collection: Cameras, audio recorders (fieldwork and interviews); online survey platforms (Wenjuanxing) for questionnaire distribution.

Data Analysis: SPSS 26.0 (quantitative data); NVivo 12 (qualitative data from interviews).

Design Framework: Adobe Illustrator, Sketch for visualizing cultural elements and

design concepts.

3.2.2 Research Procedures

Phase 1: Theoretical Foundation (January–May 2024): Conduct literature review, define key concepts, and establish theoretical framework.

Phase 2: Cultural Element Extraction (June–August 2024): Conduct fieldwork at the Bohai Shangjing Ruins Museum, document artifacts, and extract core cultural elements.

Phase 3: Case Study and Design Framework (September 2024): Analyze representative CC product cases, integrate theoretical perspectives, and develop a Bohai-themed CC product design framework.

Phase 4: Validation and Evaluation (October 2024–January 2025): Conduct expert interviews and questionnaire surveys, collect feedback, and refine the design framework.

Phase 5: Conclusion and Recommendations (February–March 2025): Summarize research findings, propose actionable recommendations for the Bohai Shangjing Ruins Museum, and identify future research directions.

3.3 Artifact Selection Criteria

To ensure the relevance and transferability of cultural elements, artifacts selected for analysis meet the following criteria:

Historical Value: Reflect key political, economic, cultural, or social characteristics of the Bohai Kingdom.

Artistic Characteristics: Possess unique aesthetic value in shape, decoration, or craftsmanship.

Symbolic Significance: Embody specific cultural symbols or spiritual connotations.

Completeness: Relatively intact form to facilitate pattern and shape extraction.

Transferability: Suitable for modern design adaptation through simplification or symbolization.

Communication Potential: Easily understood and accepted by the public, with marketization potential.

Based on these criteria, 15 key artifacts are selected, including roof tiles with Baoxianghua 3):

patterns, tri-color animal head, nine-tiered relic casket, "Tianmen Army Seal," and glazed pottery vessels.

Results and Analysis

4.1 Core Cultural Elements of Bohai Artifacts

Through fieldwork and artifact analysis, four categories of core cultural elements are identified (Table

Table 3
Core Cultural Elements of Bohai Artifacts

Element Category	Examples	Cultural Connotations
Architectural Motifs	Baoxianghua patterned bricks, lotus roof tiles, palace ridge decorations	Fusion of Tang religious aesthetics (Buddhism) and local craftsmanship; symbolize prosperity and sacredness
Artistic Patterns	Animal faces, cloud patterns, geometric motifs (concentric circles, petal layers)	Reflect Bohai's naturalistic worldview and totemic beliefs; influenced by Tang and Khitan art
Craftsmanship Techniques	Glazed pottery production, metal casting, tile inlaying	Demonstrate advanced technological level; reflect cultural exchange with the Tang Dynasty
Symbolic Objects	Relic caskets, "Tianmen Army Seal," bronze statues	Represent religious faith (Buddhism), political authority, and ethnic identity

(Source: Compiled by the author based on fieldwork)

4.1.1 Architectural Motifs

Baoxianghua patterned bricks are the most representative architectural element, featuring shallow relief double Baoxianghua patterns in concentric circles (8 outer petals, 16 inner petals, with a central nipple). This pattern, derived from Buddhist art, symbolizes purity and sacredness, while the production technique reflects Bohai's

mastery of brick-making (Gou Haiyan, 2021). Lotus roof tiles, influenced by Tang Dynasty architectural style, embody Buddhist aesthetics and are widely used in palace and temple buildings.

4.1.2 Artistic Patterns

Animal face patterns (e.g., on bronze vessels)

reflect Mohe totemic beliefs, while cloud patterns and geometric motifs (e.g., on pottery and textiles) demonstrate a harmonious blend of natural observation and abstract design. These patterns are characterized by simplicity, symmetry, and vividness, reflecting Bohai's unique aesthetic orientation.

4.1.3 Craftsmanship Techniques

Bohai's glazed pottery technology, adopted from the Tang Dynasty and further developed locally, produces bright, durable glazes in yellow, green, and reddish-brown. Metal casting techniques are exemplified by the "Tianmen Army Seal," which uses the Tang-influenced coiled strip welding method, demonstrating advanced metalworking skills (Sha Menghai, 1987).

4.1.4 Symbolic Objects

The nine-tiered relic casket, similar to Tang Dynasty relic caskets from Gansu, symbolizes Bohai's religious ties with the Central Plains. The "Tianmen Army Seal" represents political authority and administrative system inheritance from the Tang Dynasty. Bronze statues, such as the "Kunlun Slave" figures, reflect cultural exchange and religious devotion.

4.2 Expert Interview Results

Expert interviews confirm the importance of the identified cultural elements and provide insights into CC product design:

4.2.1 Cultural Element Prioritization

Scholars emphasize Baoxianghua patterns, tri-color pottery colors, and symbolic objects (relic caskets, seals) as the most representative Bohai elements, highlighting their uniqueness and historical significance.

Designers recommend prioritizing easily transferable elements (e.g., geometric patterns, color palettes) for initial product development, while deeper symbolic elements (e.g., religious artifacts) can be integrated into high-end products.

Museum Staff stress the need to balance authenticity with accessibility, ensuring products

are both culturally accurate and appealing to general audiences.

4.2.2 Design Principles

Cultural Authenticity: Avoid superficial imitation; ensure elements are used in context (e.g., Baoxianghua patterns should reflect Buddhist symbolism rather than mere decoration).

Functionality: Integrate cultural elements into practical products (e.g., tableware, textiles) to enhance user engagement.

Modern Aesthetics: Simplify complex patterns (e.g., Baoxianghua) to align with contemporary design trends; use Bohai color palettes (yellow, green, reddish-brown) for brand recognition.

Storytelling: Embed Bohai historical stories into product design (e.g., explaining the origin of Baoxianghua patterns through product packaging).

4.2.3 Market Strategy

Target Audience: Focus on young consumers (25–40 years old) interested in cultural tourism and unique products; develop entry-level (affordable) and premium (collectible) product lines.

Dissemination Channels: Leverage online platforms (e-commerce, social media) and offline collaborations (cultural venues, tourist attractions) to expand reach.

Digital Integration: Incorporate AR/VR features (e.g., scanning a product to view 3D models of Bohai artifacts) to enhance interactivity.

4.3 Questionnaire Survey Results

The questionnaire survey (278 valid responses) provides insights into consumer preferences and market demand:

4.3.1 Demographic Profile

Age: 25–34 years (45%), 35–44 years (30%), 18–24 years (15%), 45+ years (10%).

Education: Bachelor's degree or above (68%).

Occupation: Professionals (35%), students (25%), civil servants (20%), others (20%).

Bohai Culture Awareness: 65% have "limited knowledge" of Bohai culture; 20% have "some knowledge"; 15% have "in-depth knowledge."

4.3.2 CC Product Preferences

Product Types: Most popular categories include decorative items (35%), daily necessities (30%), clothing/textiles (20%), and collectibles (15%).

Price Range: 60% prefer products priced between ¥50–¥200; 25% accept ¥200–¥500; 15% are willing to pay above ¥500 for premium products.

Design Features: 75% value "cultural uniqueness" as the top factor; 60% prioritize "aesthetic appeal"; 55% emphasize "functionality."

Bohai Element Interest: Most appealing elements include tri-color pottery colors (65%), Baoxianghua patterns (60%), and animal motifs (50%).

4.3.3 Communication and Dissemination

Information Sources: 45% learn about museum CC products through social media; 30% through museum visits; 15% through cultural events; 10% through word-of-mouth.

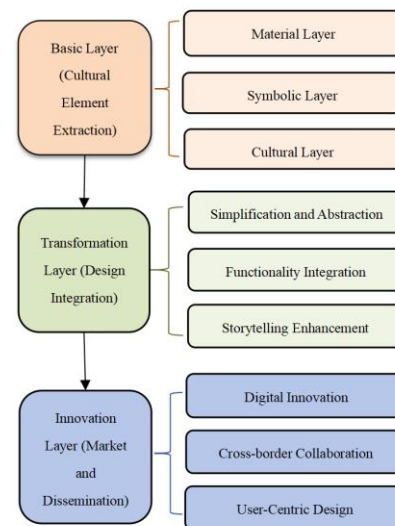
Digital Engagement: 70% are interested in AR/VR features; 65% would follow a Bohai culture social media account; 55% are willing to participate in online design contests.

4.4 Design Framework Development

Based on the results, a three-tier design framework is developed, integrating cultural elements, theoretical perspectives, and user needs (Figure 2):

Figure 2

Bohai-Themed CC Product Design Framework



(Source: Drawn by the author)

4.4.1 Tier 1: Basic Layer (Cultural Element Extraction)

Material Layer: Extract tangible elements (patterns, colors, shapes) from artifacts (e.g., Baoxianghua patterns, tri-color palette).

Symbolic Layer: Decode semiotic meanings (e.g., Baoxianghua = sacredness; lotus = purity) using semiotic theory.

Cultural Layer: Contextualize elements within Bohai's historical and social background (e.g., glazed pottery as a symbol of cultural exchange) using cultural stratification theory.

4.4.2 Tier 2: Transformation Layer (Design Integration)

Simplification and Abstraction: Adapt complex patterns (e.g., Baoxianghua) into minimalist designs suitable for modern products.

Functionality Integration: Embed cultural elements into practical products (e.g., Baoxianghua-patterned tableware, tri-color ceramic mugs).

Storytelling Enhancement: Incorporate historical narratives into product design (e.g., packaging explaining the origin of the "Tianmen Army Seal").

4.4.3 Tier 3: Innovation Layer (Market and Dissemination)

Digital Innovation: Integrate AR/VR

features (e.g., scanning a product to view a 3D model of the original artifact).

Cross-border Collaboration: Partner with local artisans, fashion brands, or digital platforms to expand product lines.

User-Centric Design: Tailor products to target audiences (e.g., student-friendly stationery, premium collectible replicas).

4.5 Framework Validation

The design framework is validated through expert feedback and consumer testing:

Experts confirm the framework's feasibility, emphasizing its balance of cultural authenticity and market appeal.

Consumer Testing: Prototypes of three product concepts (Baoxianghua-patterned notebook, tri-color ceramic mug, AR-enabled keychain) receive positive feedback, with 80% of testers expressing willingness to purchase. Key suggestions include simplifying pattern complexity and enhancing storytelling through packaging.

Discussion

5.1 Key Findings

This study identifies core cultural elements of Bohai artifacts and develops a design framework for CC products, yielding three key findings:

Core Cultural Elements: Bohai artifacts are defined by four interconnected elements—architectural motifs (Baoxianghua, lotus), artistic patterns (animal faces, geometric designs), craftsmanship techniques (glazed pottery, metal casting), and symbolic objects (relic caskets, seals)—which reflect the kingdom's cultural fusion and uniqueness.

Design Principles: Successful Bohai-themed CC products must balance cultural authenticity, modern functionality, and aesthetic appeal. Simplification of complex elements, integration of storytelling, and digital innovation are critical for market success.

Market Demand: Consumers prioritize

cultural uniqueness, aesthetic appeal, and functionality, with young professionals (25–40 years old) as the primary target audience. Affordable entry-level products and digital features (AR/VR) are key drivers of engagement.

5.2 Theoretical Contributions

This study contributes to academic research in three ways:

Cultural Heritage and Design Integration: Expands the application of semiotic theory, artistic theory, and cultural stratification theory in museum CC product design, providing a systematic framework for extracting and transforming ethnic cultural elements.

Bohai Culture Research: Fills the gap in Bohai cultural heritage application research, highlighting the potential of Bohai artifacts as a source of design inspiration.

Museum CC Product Development: Offers a user-centric, data-driven approach to CC product design, addressing the industry's homogeneity problem by emphasizing deep cultural engagement.

5.3 Practical Implications

For the Bohai Shangjing Ruins Museum, the research provides actionable recommendations:

1. Product Development:

Entry-Level Products: Develop affordable daily necessities (notebooks, mugs, keychains) featuring simplified Baoxianghua patterns and tri-color palettes.

Mid-Range Products: Launch textiles (scarves, tablecloths) with animal face and cloud patterns; incorporate storytelling through packaging.

Premium Products: Create collectible replicas (miniature tri-color animal heads, seal-inspired desk accessories) and AR-enabled products (e.g., a relic casket model that displays 3D archaeological sites).

2. Dissemination Strategy:

Online Channels: Establish social media

accounts (WeChat, Douyin) to share Bohai history and product development stories; sell products on e-commerce platforms (Taobao, JD.com).

Offline Collaboration: Partner with local tourist attractions, cultural venues, and artisans to expand distribution; host design workshops and exhibitions to raise awareness.

Digital Engagement: Develop a mobile app featuring AR scans of products, allowing users to interact with virtual Bohai artifacts and historical scenes.

3. Capacity Building:

Interdepartmental Collaboration: Establish a dedicated CC product team integrating museum curators, designers, and marketing professionals.

Talent Development: Collaborate with design universities to train students in Bohai culture and CC product design; invite experts for workshops.

Research Investment: Conduct ongoing research on Bohai artifacts to identify additional cultural elements and update product lines.

5.4 Limitations and Future Research

This study has several limitations:

Artifact Scope: Focuses on artifacts in the Bohai Shangjing Ruins Museum; future research could include artifacts from other Bohai sites for a more comprehensive element extraction.

Geographical Limitation: Questionnaire surveys are limited to Ning'an City and online respondents; broader regional or national surveys could provide more representative market data.

Prototype Testing: Tests a small number of product prototypes; future research could conduct large-scale user testing and market pilot studies.

Future research directions include:

Digital CC Products: Explore metaverse and NFT applications (e.g., digital collectibles of

Bohai artifacts) to expand reach to younger audiences.

Cross-Cultural Comparison: Compare Bohai cultural elements with other Northeast Asian cultures (e.g., Silla, Khitan) to identify unique selling points.

Sustainable Design: Incorporate eco-friendly materials and traditional craftsmanship into CC products, promoting cultural and environmental sustainability.

Conclusion

This study explores the integration of Tang Dynasty Bohai Tribe cultural heritage artifacts into modern CC product design to enhance design value and promote cultural dissemination. Through literature review, fieldwork, expert interviews, and questionnaire surveys, the research identifies core cultural elements of Bohai artifacts—architectural motifs, artistic patterns, craftsmanship techniques, and symbolic objects—and develops a three-tier design framework balancing cultural authenticity, functionality, and market appeal.

The findings demonstrate that Bohai-themed CC products have significant potential to serve as both cultural communication vehicles and economic drivers for the Bohai Shangjing Ruins Museum. By leveraging deep cultural engagement, digital innovation, and user-centric design, the museum can develop distinctive products that raise public awareness of Bohai culture, generate revenue for heritage preservation, and contribute to the development of China's museum CC industry.

As cultural heritage becomes increasingly important in global and national contexts, this study provides a model for small and medium-sized museums to transform underrepresented cultural resources into innovative, marketable products. By preserving and promoting Bohai culture through CC products, the Bohai Shangjing Ruins Museum can play a vital role in fostering cultural diversity and enhancing Chinese cultural soft power.

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