

# INNOVATIVE PATHWAYS AND DESIGN STRATEGIES FOR ENAMEL CRAFT BASED ON FASHION THEORY

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## ABSTRACT

Against the backdrop of craft revivals, enamel demonstrates a stronger potential for modern transformation compared with many other traditional crafts. Nevertheless, the development of enamel is constrained by several innovation bottlenecks: in terms of materials, high-temperature enamel still lacks breakthroughs in the diversity of material types; in terms of visual language, enamel remains bound to the aesthetic paradigm of vitreous glaze; and in terms of consumption contexts, traditional enamel products struggle to align with the cultural preferences and fashion-oriented consumption habits of younger audiences. In light of these challenges, this study draws upon fashion theory and consumer behavior theory to map out the trajectories of material and conceptual innovation in enamel craft, and to examine both the possibilities and limitations of integrating Chinese enamel jewelry into contemporary design systems.

**Keywords:** Enamel Craftsmanship, Innovation Pathway, Fashion Theory

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## INTRODUCTION

Enameling is a decorative technique that involves fusing vitreous glaze onto a metal substrate, combining visual expression, surface protection, and long-term durability (Tite & Shortland, 2008). Against the backdrop of continued global growth in the fashion jewelry sector, enamel jewelry has entered the mid-to-high-end market characterized by artistic value and differentiated design. According to Cognitive Market Research (2025), the global fashion jewelry market reached USD 295.145 billion in 2024 and is projected to grow to USD 505.827 billion by 2031. Emerging consumption trends emphasizing artistic expression, sustainability, and emotional value have renewed attention toward enamel jewelry, given its rich material language and embedded craft culture.

Simultaneously, technological advancements such as automated glazing and laser engraving have enabled more standardized production, improving the feasibility of integrating enamel products into the fashion industry value chain. However, despite these opportunities, several bottlenecks hinder the contemporary development of enamel craftsmanship. The high dependency on extreme firing temperatures and manual operations leads to low production efficiency and high defect rates, which contradicts the fast-paced, efficiency-driven logic of the fashion industry. Additionally, enamel artifacts are often confined to historical or fine arts contexts, lacking effective resonance with contemporary consumer culture, digital platforms, and youth aesthetics. This contextual disjunction not only weakens the expressive relevance of enameling in contemporary design but also limits its commercial dissemination and brand-building innovation.

In response, this study adopts a fashion-contextual perspective to investigate transformation of enamel craftsmanship in terms of both material systems and design ideologies, mapping its transition from traditional craft to contemporary expression.

### Research Objectives

This research aims to explore the pathways through which traditional enamel craft can achieve both material and conceptual innovation within the contemporary fashion context. Employing research methods such as literature review, case studies of representative examples, and in-depth interviews, the study examines contemporary expressions of enamel jewelry from three dimensions: the evolution of enamel craft innovation, the perceptual experience of fashion jewelry, and the design strategies of fashion-oriented enamel.

At the theoretical level, the research seeks to construct an analytical framework for integrating traditional crafts into contemporary fashion systems; at the practical level, it focuses on consumer preferences for personalization and aesthetic orientation, combining traditional craftsmanship with modern design language to investigate the innovative potential of enamel jewelry in today's fashion market.

## LITERATURE REVIEWS

### Consumer Behavior

Consumer behavior theory highlights the psychological motivations and cultural constructions that influence individual decision-making in consumption processes (Schiffman & Kanuk, 2010). Evolving from the early “rational actor” model, contemporary perspectives increasingly emphasize symbolic value, emotional attachment, and self-extension as key drivers of consumption (Bourdieu, 1984; Veblen, 1899). Historically, jewelry functioned as a marker of social status and hierarchy, aligning with what Veblen termed “conspicuous consumption”.

Since the 20th century, diversification in materials and liberalization of styles have reshaped the logic of consumption (Evans, 2013). Contemporary consumers increasingly gravitate toward branded products and concept-driven design, where meaning construction and personal identity play central roles. The emergence of art jewelry exemplifies this shift. In this context,

the choice to wear enamel-based art jewelry is no longer merely decorative; rather, it serves as a medium for self-representation and cultural expression (Cox, 1997).

Furthermore, market trends, as a key concept in consumer behavior studies, not only reflect shifts in aesthetic preferences and cultural structures but also signal the evolving logic of industry development (Kotler & Keller, 2015). According to Solomon (2018), trends serve as vehicles for identity expression and emotional affiliation an effect that is particularly pronounced in jewelry consumption, where symbolic value is paramount. Donzé (2020) emphasizes that the perceived value of jewelry has increasingly shifted from its material attributes to the lifestyle and cultural capital constructed by brands. In recent years, consumer preferences have demonstrated a clear inclination toward individualization and non-traditionality, leading to growing interest in customization and independent design languages (Liu & Zhang, 2022).

Moreover, material and process innovation has emerged as a driving force in trend formation. As noted by Skinner (2013) and Hemmings (2004), materials such as enamel, composite media, and recycled metals due to their heterogeneity and experimental character have gained aesthetic legitimacy in the context of contemporary expression.

### **Fashion Theory**

From a historical perspective, fashion originated as an imitative practice among the European aristocracy, serving to reinforce social hierarchies and ritualized codes of appearance. With the advent of industrialization, urbanization, and mass communication, fashion gradually broke away from its aristocratic exclusivity and evolved into a widely participatory cultural practice-constituting a mechanism for the construction of both individual identity and collective affiliation (Lipovetsky, 1994).

From a semiotic standpoint, fashion functions not merely as material consumption but as a system of signs. Barthes (1983) famously proposed that the “language of fashion” carries connotative meanings, functioning as a cultural “myth” that encodes social ideologies through garments. Clothing thus becomes a form of “wearable language” through which individuals perform gender, class, and attitude across different cultural contexts.

Sociological approaches have further emphasized the structural power relations embedded in fashion. Bourdieu (1984) argued that “taste” is not an innate sensibility but a reflection of social and cultural capital. The dominant classes distinguish themselves through aesthetic codes, while subordinate groups engage in mimicry as a strategy for upward mobility-thereby producing a “trickle-down” effect. However, contemporary fashion culture increasingly exhibits reverse flows, such as “subcultural resistance” and the appropriation of grassroots styles, which highlight the complexity and multiplicity of fashion mechanisms.

In line with this, cultural theorists have interpreted fashion as a site of both resistance and identity formation. Subcultural groups-including punk, skate, and LGBTQ+ communities employ distinct sartorial codes to challenge hegemonic norms, giving rise to what Hebdige (1979) terms the “politics of style”. Here, fashion serves not only as a medium of personal expression but also as a tool for collective dissent and cultural representation.

Finally, fashion is deeply embedded in the aesthetic, corporeal, and consumer cultures of contemporary society. As Entwistle (2000) notes, fashion not only disciplines the body but also commodifies it through visual representation, responding to the consumer society’s demand for identity performance, emotional resonance, and the reconfiguration of desire. In this regard, fashion represents not only the “freedom of beauty” but also the “discipline of the body” and the “reproduction of culture”.

### **Innovation Pathways of Enamel Craftsmanship**

#### **1) Techniques and Materials Innovations in Enamel Craftsmanship**

**1.1) Innovation in Metal Substrates:** As the foundational support for enamel application, metal substrates play a critical role in determining the material, structural, and tactile characteristics

of enamel pieces. In the context of contemporary material innovation, metal bases have expanded from traditional gold, silver, and copper to include lightweight and industrial Compagnoni, 2021 materials such as titanium, stainless steel, and aluminum (Ashis Janah, 1968; Russo et al., 2021). Meanwhile, the integration of advanced fabrication techniques—such as wire-based spatial modeling and 3D printing has enhanced the spatial expressiveness and formal diversity of metal substrates. Additionally, the fusion of embossing and pressure-formed textures (Namoco et al., 2007) not only increases visual distinctiveness but also strengthens the narrative capacity of enamel jewelry as a medium of cultural expression.

**1.2) Innovation in Enamel Glaze:** Color functions not only as a key aesthetic identifier but also as a medium for identity construction and emotional transmission. As consumer demands shift toward greater “visual impact” and “sensorial engagement”, innovation in enamel glaze properties has become central to the evolution of its visual language. Developments such as microcrystalline glazes for their delicate texture, high-transparency glazes that create spatial depth, and multi-phase color blending systems that generate dynamic light effects all respond to the contemporary fashion emphasis on atmosphere, visual layering, and differentiated expression (Vezzalini, 2015).

**1.3) Innovation in Glazing Techniques and Forming Logic:** Enamel glazing and forming techniques are shifting from traditional craftsmanship toward an integrated design expression characterized by diversity and adaptability, signaling a systemic transformation of enamel from a decorative craft to an interdisciplinary medium. The adoption of digital transfer, thermal transfer, and other technological processes has introduced a “dual-track model” of image production combining mass production with customization which aligns with the coexistence of rapid product iteration and individualized symbolic expression (Lemire, 1997). The layered integration of composite techniques no longer serves purely aesthetic decoration but instead advances multidimensional material synergy and rhetorical detailing, reflecting fashion’s pronounced reliance on “refined narratives” and a “culture of detail”. Meanwhile, the rise of structural composition and modular mechanisms enables enamel jewelry to engage in more complex scenarios of spatial construction and the reconfiguration of body-object relationships.

## **2) Conceptual Innovation in Enamel Craftsmanship**

**2.1) European Context:** Prior to the 14th century, enamel craftsmanship was primarily applied within the realm of religious art and ceremonial objects, serving as a visual medium to convey faith, embody sacred imagery, and mediate the spiritual relationship between humans and the divine, rather than functioning as mere aesthetic or consumer goods. Its essential function was thus religious, with forms designed to uphold spiritual worship and sacred order. For example, during the Byzantine and Romanesque periods, techniques such as cloisonné and champlevé enameling were not merely chosen for technical reasons but were dictated by the religious functions of the objects they adorned. The unique gloss, durability, and highly saturated colors of enamel provided an ideal symbolic medium for theological narratives of eternity, holiness, and divine order (Penny, 1991; Henderson, 2011). Particularly, gold-backed translucent enamels were not only technical breakthroughs but also visual expressions of the Church’s pursuit of “sacred light” and “heavenly authority”.

The 15th and 16th centuries, marked by the Renaissance and the rise of humanism, witnessed a gradual shift of power structures from “divine right” toward “human rights”. This transition directly influenced the social function and aesthetic positioning of enamel crafts: enamel objects evolved from spiritual media serving religious rituals into symbols of royal power and aristocratic taste. Due to the high costs and technical thresholds of enamel techniques—such as delicate basse-taille and grisaille enameling enamel maintained its rarity and status-symbol function over extended periods. Enamel pieces not only satisfied the aristocracy’s demand for bespoke luxury but also became important tools for family identity construction and humanistic narrative expression (Cherry, 1991; Scarisbrick, 2013).

The rise of capitalist modernity in 18th and 19th century Europe triggered a fundamental rupture, transforming enamel from an aristocratic symbol into a commodified medium for individual expression. No longer confined to church or court patronage, enamel entered the broader commodity circulation sphere. Within this context, the “conceptual innovation” of enamel increasingly stemmed from its capacity to meet the aesthetic and emotional demands of the bourgeoisie. From sentimental memorial jewelry and enamel pocket watches to industrial-scale heat-transfer enameling, these new forms reflected a redefinition of enamel’s meaning from sacred symbol or dynastic emblem to personal memory, taste, and fashion attributes. As bourgeois ideology foregrounded individuality and family life, enamel craftsmanship developed lighter, more economical, and mass-producible forms (Barthes, 1983).

The 20th century’s proliferation of art movements challenged the hierarchical system that subordinated craft to fine art, enabling enamel to gradually free itself from its historical role as a marker of power and identity. It evolved into an autonomous artistic medium with conceptual expressive capacity, thus redefining its cultural and artistic functions. Movements such as Art Nouveau, Art Deco, and Modernism rejected excessive ornamentation, emphasizing formal experimentation, artistic autonomy, and process-oriented creation. In this context, enamel artists expanded beyond decorative jewelry into sculpture, architectural surface treatments, and wearable art. Techniques like plique-à-jour and experimental firing methods were reinterpreted as concrete expressions of artists’ individual intentions, rather than mere demonstrations of technical skill (Dormer, 1994).

**2.2) Chinese Context:** Chinese enamel craftsmanship, particularly cloisonné (Jingtai Blue), followed an institutionalized path characterized by “political control and ritual service”. During Ming dynasty, the central government established imperial workshops that regulated production processes, material procurement, and pattern design, making enamel an extension of imperial legitimacy and state ritual order (Li, 2001; Liu, 1963). Especially during the Jingtai period, the royal preference for deep blue glaze led to the emergence of the “Jingtai Blue” nomenclature and stylistic system, with enamel works primarily serving religious and state ceremonies, thereby reinforcing political and religious symbolism (Chen, 2008).

Moreover, the level of innovation in enamel techniques was strongly influenced by the personal tastes of rulers. Notably, the Kangxi Emperor’s fascination with Western painting techniques introduced painted enameling, exemplifying politically motivated openness and technological innovation (First Historical Archives of China, 1996).

Originally highly institutionalized and serving imperial order, Chinese cloisonné underwent a modern transformation in the 20th century driven by expanding mass consumer culture and policies promoting craft nationalization. This shift was propelled by market demand, material innovation, and identity expression. It institutionalized advances in lightness, standardization, and serial production, while also enabling enamel artisans to adapt to the increasingly pluralistic aesthetic preferences of society (Tang & Li, 2004).

**2.3) The 21st Century to Present:** In contemporary practice, enamel innovation is increasingly driven by conceptual frameworks related to identity politics, sustainability, and the revival of post-industrial craftsmanship. Artists utilize enamel’s vibrant colors and textures to explore themes such as gender, memory, and cultural hybridity, often integrating digital fabrication, reclaimed materials, or participatory methodologies. Functionally, enamel jewelry is progressively moving beyond its conventional role as wearable adornment, embracing modes of expression that are installation-based, conceptual, and exhibition-oriented. These practices transcend mere technical innovation and should instead be understood as a redefinition of enamel’s social and semiotic functions within a globalized and pluralistic context (Riggs, 2020).

## RESEARCH METHODOLOGY

### Data Collection

Researchers collected data using the following methods and tools:

**Literature Review:** This section aims to understand the characteristics and operating mechanisms of fashion-related concepts; to review relevant literature on consumer behavior theory; and to examine literature concerning the aesthetic styles, technical materials, and design concepts of enamel craft.

**Case Study:** As an artisanal practice distinguished by its striking visual effects, enameling warrants the systematic collection and analysis of exemplary cases that demonstrate innovative approaches. The case selection in this study follows three main criteria:

- 1) Technological Evolution: Cases are chosen from different stages of enameling history where significant innovations occurred in the morphology of enamel glaze, composition of enamel materials, or application techniques.
- 2) Craftsmanship and Technical Process: Cases are selected that exhibit notable advancements in metal composition, metal forming techniques, or methods of textural metal surface treatment, revealing new directions in the material and structural development of enamel craft.
- 3) Conceptual Innovation: Representative enamel works from various European periods are analyzed as case studies for their symbolic and ideological transformations, reflecting how enameling served as a medium of artistic expression, political representation, and cultural identity.

All selected cases correspond to the central focus of this research: the exploration of material innovation pathways in the use of enamel techniques and the conceptual innovation embodied in enamel artifacts as carriers of historical, cultural, and ideological meaning.

### In-depth Interviews:

To gain a deeper understanding of the current development of enamel craftsmanship within the contemporary fashion context, this study conducted thirty semi-structured, in-depth interviews with five enamel practitioners and jewelry designers. The aim was to explore, from the perspective of practitioners, the pathways of inheritance and innovation in enameling. The interview content centered on three core themes:

- 1) the historical continuity and transmission of enameling techniques;
- 2) innovative practices in materials and craftsmanship; and
- 3) aesthetic trends and consumer feedback within the contemporary fashion market.

The interview questionnaire was organized into four progressive stages, each guided by a corresponding set of questions to ensure the coherence between data collection and subsequent coding analysis. The detailed structure is as follows:

**The first stage** focused on understanding the respondents' backgrounds and professional experiences, collecting information about their personal trajectories, learning paths, and mastery of enameling techniques. The purpose of this stage was to consider how individual background differences influence innovative practices and design orientations.

**The second stage** explored respondents' perceptions of the inheritance and cultural cognition of enamel craftsmanship, emphasizing their understanding of "tradition" and "transmission," as well as how they negotiate the tension between traditional and contemporary design in their creative processes. This stage aimed to extract themes related to cultural identity and regional differences (e.g., Chinese, European, or Japanese contexts), serving as key evidence in identifying pathways of conceptual innovation.

**The third stage** investigated respondents' insights into technical and material innovation in enameling, directly probing their practical experiences and evaluative criteria regarding material experimentation, new firing techniques, digital tools, and cross-disciplinary collaboration. This stage contributed to analyzing the types and boundaries of material innovation (i.e., what still qualifies as enamel) and identifying existing constraints or

bottlenecks.

The fourth stage examined respondents' perspectives on the fashion context and market feedback, focusing on the market positioning of enamel works, audience profiles, and the impact of exhibitions and social media dissemination. Data from this stage helped to construct a comprehensive understanding of the process linking creative intention, dissemination strategy, and consumer response.

The interviewee information is presented in Table 1.

**Table 1** Interviewee information

<b>ID</b>	<b>Name</b>	<b>Occupation</b>	<b>Research Focus</b>	<b>Years of Experience</b>
1	Yu Xingxing	Jewelry Designer	Jade Carving, Contemporary Jewelry Design	14
2	Li Ying	Enamel Crafts Inheritor	Enamel Craft, Contemporary Jewelry Design	12
3	Wang liping	Enamel Crafts Inheritor, Jewelry Educator	Enamel Craft, Contemporary Jewelry Design	21
4	Wang Qiong	Enamel Crafts Inheritor, Jewelry Educator	Enamel Craft, Contemporary Jewelry Design	17
5	Zhao yin	Jewelry Educator	Enamel Craft, Lacquer Art, Contemporary Jewelry Design	25

### Data Analysis

**Literature Analysis:** This study employs literature analysis to systematically examine the development and transformation of enamel craft within the context of contemporary fashion, focusing on three aspects: cross-cultural comparison, craft innovation, and innovation in design concepts. First, through a comparison of Chinese and European literature, the study reveals the transformation of enamel from a symbol of power to a medium of individual expression. Second, by integrating literature on techniques and artistic works, it analyzes how innovations in glaze formulations, metal substrates, and firing methods expand the visual language and formal possibilities of enamel craft. Finally, the study considers the functional transformation of design concepts under fashion mechanisms, providing a theoretical foundation for constructing contemporary enamel design methods and innovation logic.

**Case Analysis:** The study adopted case analysis by selecting enamel artworks and artifacts as research subjects to investigate innovation pathways in material application, craftsmanship, and conceptual articulation. Case selection balanced tradition continuity and fashion-driven innovation, aiming to elucidate how enamel craft transforms from decorative technique to contemporary visual language in concrete design practices. This provides empirical support for formulating an innovation framework of enamel within the "traditional craft-contemporary fashion" paradigm.

**In-depth Interviews:** This study conducted thirty semi-structured, in-depth interviews with five enamel practitioners and jewelry designers. All interviews were audio-recorded, transcribed verbatim, and carefully proofread. The textual data were analyzed using NVivo software through open coding and keyword frequency analysis, enabling the extraction of high-frequency themes from the question-oriented corpus and facilitating both intra- and inter-stage comparisons. The final analysis follows the core questions of each interview stage as guiding threads, presenting findings that directly correspond to the interview outline to ensure that the conclusions remain closely aligned with the original framework rather than generalized interpretations.

## RESEARCH RESULTS

### Analysis of Innovation Pathways in Enamel Glaze

Enamel glaze has undergone multidimensional innovations in material states, compositional systems, and pattern formation methods (Table 2). First, leveraging polymers and digital fabrication technologies, traditional powdered enamel has been expanded into liquid, paste, and gel forms, significantly enhancing adaptability on complex curved surfaces and intricate patterns. Second, compositional innovations involve lead-free, low-temperature borosilicate systems that comply with environmental regulations while ensuring vivid color performance. Third, the ‘separation glaze’ technique exploits differences in glaze fluidity to naturally form pattern boundaries during firing, overcoming the limitations of manual delineation and paving an evolutionary pathway toward automated expression and contemporary surface design in enameling.

Table 2 illustrates the application of liquid enamel in miniature and painted enamel works; the advanced production level of lead-free enamel; and the use of separated enamel glazes in enamel jewelry.

**Table 2** Innovation Pathways in Enamel Glaze

Innovation Focus	Representative Cases	Fashion Reconstruction Analysis
Physical Property Innovation		Liquid enamel is produced by pulverizing enamel blocks into micron-sized particles using a micro-grinder, and then transforming them into a liquid form through the addition of binders and plasticizers. It has been widely used in the creation of portraits, genre paintings, and religious subjects. In the contemporary fashion context, liquid enamel holds potential for personalized customization and emotional value.
Chemical Property Innovation		Lead-free enamel: applicable across all types of enamelware. Lead-free enamel glazes, represented by manufacturers such as Thompson Enamel (USA), exemplify ecological reconstruction aligned with sustainable fashion trends, enabling contemporary expression of traditional craftsmanship.
Pattern Formation Innovation		Enamel pieces that employ Separation-glaze enamel exhibit a spontaneous visual beauty that cannot be achieved with traditional enameling methods, such as painted enamel or cloisonné. The cases analyzed in this study demonstrate vibrant, multicolored hues and lively, naturalistic patterns made possible by this technique.

### Pathways of Innovation in Enamel Substrate Materials and Structures

The pathways of innovation in enamel base materials and the forms of structural materials have undergone significant development. The range of precious metals has expanded beyond traditional gold, silver, and copper to include alloys such as rose gold, titanium, aluminum, and stainless steel, meeting the demand for personalized color and symbolic expression. Forming techniques have evolved from hammer forging to cold folding, CNC cutting, and 3D printing, enhancing structural expression (such as deconstructive and futuristic aesthetics) and individuality. The substrate is no longer merely a background for supporting enamels; instead, it incorporates diverse metalworking techniques to create rich surface textures, becoming a central compositional element in the visual narrative of enamel works.

Table 3 presents case studies of enamel products showcasing the application of new substrate materials such as titanium alloys and stainless steel; the use of wire and sheet forms; and the application of etching, chasing, and hammering techniques.

**Table 3** Innovation Pathways in Enamel Substrate Materials and Structures

	Case Examples1	Case Examples2	Innovation Points
Material Innovation			<b>Case 1</b> demonstrates the visual effects of enamel glaze applied to titanium metal, while <b>Case 2</b> illustrates the visual effects of enamel glaze on stainless steel construction materials.
Forming Technique Innovation			<b>Case 1</b> demonstrates the use of wire in contemporary enamel jewelry through stacking and mesh-weaving techniques, while <b>Case 2</b> illustrates the application of new technologies, such as 3D printing and CNC cutting, in contemporary enamel jewelry.
Textural and Visual Innovation			<b>Case 1</b> employs etching techniques, while <b>Case 2</b> utilizes chasing and hammering methods. Innovations in the texture of metal substrates can enhance the cultural narrative capacity of enamel craftsmanship within a contemporary fashion context.

### Pathways of Conceptual Innovation in European Enamel Art

From the “sacred mechanism” that served religious order in Middle Ages, to the “hierarchical aesthetic mechanism” that articulated class and power under monarchical regimes, then to the “market-driven mechanism” characterized by commodification and individual style within the capitalist context, and ultimately to today’s “networked value-negotiation mechanism” manifested through exhibitions, curatorial practices, and social media platforms addressing pluralistic agendas each conceptual shift in enamel practice and reconfiguration of its dissemination strategies has been deeply embedded within the political and cultural structures of its respective historical epoch.

Table 4 analyzes enamel artifacts and products from before the 14th century to the 21st century, outlining the innovative drivers that emerged through their interaction with the external environment across different historical stages.

**Table 4** Conceptual Innovation of European Enamel Craftsmanship

Time Period	Case Examples	External Environment	Factors Influencing Enamel Innovation
Before 14th Century		Religious rule; theocracy over human rights	The cases employing cloisonné enamel to depict the motif of the Father and the Son fully utilize enamel's gloss, durability, and saturated colors, making it an ideal symbol for theological narratives such as "eternity" and "divinity," and forming a visual symbolic system of sacred aesthetics.
15th-16th Century		Rise of Humanism	The enamel pieces in the cases employ <b>champlevé (or relief) enamel</b> techniques, featuring rich colors and vivid figurative forms. These characteristics align with the late Renaissance emphasis on realism, narrative, and humanistic ideals, transforming enamel objects from instruments of ecclesiastical authority into visual symbols of social status and cultivated taste.
17th Century		Naturalism and dynamic expression	This wedding jewelry piece combines <b>cloisonné enamel</b> with the then-popular table-cut diamonds and trembling (pavé) techniques. Through motifs such as anchors, doves, and hearts symbolizing fidelity, peace, and steadfastness, it reflects the cultural practice of the aristocracy using fashionable jewelry in ceremonies like weddings to express virtue and family values.
18th-19th Century		Visual luxury and decoration	Enamel became a decorative accessory enhancing diamond visuals, shaped by royal tastes (e.g., pink and blue glazes), integrating into court fashion and power aesthetics.
20th Century		Emergence of capitalism; Industrial Revolution	Strongly influenced by Art Nouveau, enamel featured naturalistic patterns and soft colors; during the Art Deco period, enamel showed geometric abstraction, vivid colors, and use with affordable materials; under Modernism, enamel jewelry combined mixed media and rational aesthetics, achieving conceptual design and individual expression, becoming prominent fashion accessories paired with exaggerated attire.
21st Century-Present		Craft revival; individual expression; digital technology integration	Contemporary enamel has transformed from decorative craft into a narrative and culturally rich fashion medium. Innovations in imagery, materials, structure, and social themes are evident in high jewelry and art. It expresses personal identity and emotions while addressing digitization, sustainability, and multiculturalism, bridging tradition with modernity and craftsmanship with technology.

### **Comparative Analysis of Innovation Paths in Chinese and Western Enamel Craftsmanship**

The development paths of enamel craftsmanship in China and Europe exhibit significant differences in institutional logic. In China, enamel craft was deeply embedded within the centralized imperial court system, long functioning as a material language of royal ritual and hierarchical order. Its development was subject to strong political control and standardized craft regulations. In contrast, the European trajectory of enamel shows a more flexible and diversified pattern, evolving from religious sacred objects to artistic adornments, and later into systems of self-expression aligned with modernist and feminist aesthetics, reflecting a functional shift from symbols of authority to instruments of bodily politics.

In the mid-to-late 20th century, European enamel gradually integrated into the modern luxury goods system, becoming a visual symbol within brand culture and fashion discourse. Under the influence of brands such as Cartier and Van Cleef & Arpels, enamel jewelry emerged as a symbol emphasizing craftsmanship, rarity, and “status taste,” with designs increasingly individualized and refined, highlighting the integration of visual impact and sensory experience. This development path demonstrates a high degree of coupling between market logic and artistic language.

By contrast, in 20th-century China, enamel craft remained strongly influenced by state cultural policies and collective institutional frameworks. From 2006 onward, the designation of “Intangible Cultural Heritage” incorporated techniques such as Cloisonné into the category of national cultural assets, greatly enhancing their symbolic value but also reinforcing conservative design styles and standardized forms. Enamel practice under this collectivist orientation emphasized cultural orthodoxy and political function, resulting in relatively limited design freedom, functional diversity, and aesthetic innovation.

However, in the 21st-century wave of cultural revival, both Chinese and European contexts have integrated enamel into mechanisms of “identity politics” and “cultural memory,” making it a dual carrier of “national aesthetics” and “personal memory.”

### **Analysis of the Fashion Potential of Six Common Enamel Techniques**

This study, through case analysis and in-depth interviews with enamel practitioners, argues that traditional enamel techniques can be revitalized, demonstrating high material adaptability and visual innovation (see Table 5).

The semi-structured interviews indicate that cloisonné enamel, chasing enamel, relief (or ronde-bosse) enamel, painted enamel, heat-transfer enamel, and miniature painted enamel are the six most commonly used traditional enamel techniques among practitioners.

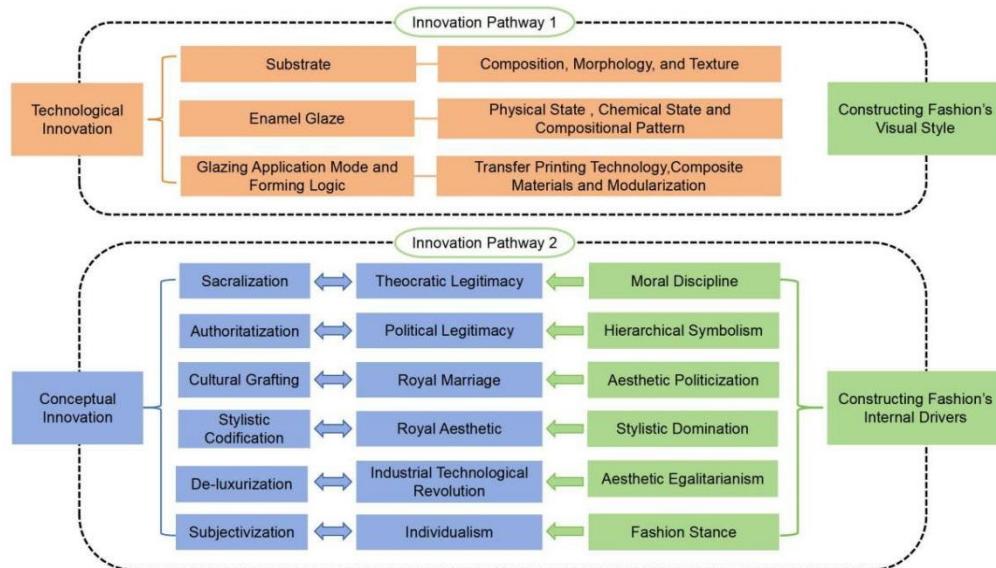
Moreover, respondents generally perceive that enamel jewelry in contemporary fashion is undergoing a transition from a “luxury symbol” to a “cultural expression.” Fashion brands and independent designers leverage narrative-driven design, limited editions, and social media dissemination to reposition enamel as a visual symbol of emotion and identity.

**Table 5** Feasibility of Fashion Innovation in Traditional Enamel Techniques

Technique Type	Case Example	Fashion Reinterpretation Analysis
Cloisonné Enamel		Modern patterns can be used to replace traditional cloisonné motifs, achieving a fusion of contemporary fashion and decorative styles.
Champlevé Enamel		CNC engraving technology can be employed to replace traditional hand chasing, thereby better expressing structural aesthetics and digital textures, while enhancing a sense of technological sophistication and futurism.
Relief Enamel		Contemporary, deconstructed enamel forms can be created to replace overly realistic depictions of human and animal figures.
Painted Enamel		Narrative illustration style + detailed depiction, emphasizing emotional expression and personalized customization.
Heat Transfer Enamel		Efficient image transfer supporting AI patterns and digital printing, adapting to fast-changing fashion cycles.
Plique-à-jour Enamel		3D printing technology supports the translucent metal framework required for plique-à-jour, realizing color effects changing with light.

### Design Strategy Analysis of Enamel Craft Innovation Based on Fashion Theory

This study, through a comprehensive literature review and questionnaire survey, delineates a dual-path evolutionary logic of “technical innovation” and “conceptual innovation” in contemporary enamel expression. Technical dimension is primarily reflected in transformations of material systems, forming structures, and visual compositions, encompassing innovations in substrate materials, enamel formulations, application techniques, and composite media. These changes respond to the fashion system’s demands for aesthetic novelty, structural complexity, and rapid iteration. The conceptual dimension focuses on the semantic shift in enamel’s cultural function, marking its transition from a sacred and hierarchical symbol to a carrier of individual expression and identity politics. This involves issues such as de-luxification, stylistic symbolization, cultural appropriation, and articulation of social stances. Within this framework, fashion operates not only as a generator of aesthetic trends but also as a social mechanism that profoundly restructures craft language and cultural functions, enabling enamel to evolve from a static decorative craft into an active medium of cultural production and social narration. The above “dual-path-multidimensional” schematic reveals how traditional craft achieves systematic renewal in visual language, material logic, and social meaning within contemporary fashion systems, as illustrated in Figure 1.



**Figure 1** The Dual Influence of Fashion Theory on the Innovation Pathways of Enamel Craftsmanship

This study proposes three design strategies corresponding to the dimensions of visual culture construction, bodily-structural coordination, and material-technical innovation, reflecting fashion's dual driving mechanism on conceptual reconstruction and craft innovation within enamel techniques.

First, the strategy of reconstructing visual language aims to translate enamel motifs from decorative patterns into cultural symbols. This pathway emphasizes fashion's symbolic function as a driver of enamel visual system. Traditional enamel patterns and colors should be redefined as culturally encoded visual signs that engage with social themes such as gender, class, and memory. Through reinterpretation of glaze hues, textures, and compositions, enamel shifts from aesthetic ornamentation to cultural identity and social meaning.

Second, by coordinating the relationship between the body and jewelry, this strategy expands the scope from wearing experience to perceptual politics. Grounded in Entwistle's theoretical framework of the "fashioning of the body," enamel jewelry can intervene in wearers' bodily postures and sensory perceptions, becoming a medium for cultural identity embodiment. Design interventions may include structural variability and contextual adaptability, such as asymmetrical forms, modular combinations spanning body parts, and convertible wearing styles. This enables enamel not only as physical adornment but also as a tangible, performative fashion narrative at the bodily level. Moreover, integrating enamel with smart technologies can extend its future roles in wearable tech and interactive accessories.

Finally, the strategy focusing on breakthrough material experimentation facilitates the transition from craft innovation toward systemic embedding within the fashion industry. This approach highlights profound innovations at the material level, emphasizing how enamel adapts to the rapid dynamics of fashion. Development of intelligent responsive glazes (e.g., thermochromic, magnetic, environmental sensors) alongside digitally generated patterning methods (AI-driven designs, parametric modeling) not only enhances technical expressive freedom but also equips enamel to meet contemporary fashion's demands for rapid updates, customization, and co-creation. This mechanism embodies a shift from traditional craft logic to systematic design logic, positioning enamel as a platform-based, disseminable, and extensible fashion component.

## DISCUSSION & CONCLUSION

### Discussion

Building on the understanding of contemporary innovation pathways in enamel craftsmanship, it is essential to further investigate how the contemporary fashion context shapes specific design practices in accessories and apparel. Particular attention should be paid to the direct and indirect influence of social media on modern fashion accessories and clothing, including its role in shaping aesthetic trends, brand narratives, and consumer behavior. In addition, quantitative consumer research is indispensable; through surveys and behavioral tracking data, researchers can more precisely assess young consumers' cultural acceptance, aesthetic preferences, and purchase intentions regarding contemporary enamel jewelry, thereby providing empirical evidence to inform design strategies and market positioning.

### Conclusion

The principal conclusions are as follows:

#### **Enamel Innovation as a Conceptual-Technical Dual-Driven Structure**

On the one hand, at the level of techniques and materials, the driving force of enamel innovation primarily arises from the integration of material experimentation and digital design. Respondents frequently experimented with **low-temperature sintering enamels, composite metal substrates, 3D-printed molds, and laser engraving technologies** to enhance production stability and enable more complex forms. Such technological integration not only expands the formal possibilities of enamel but also transforms it from a "decorative craft" into an "experimental medium."

On the other hand, contemporary expressions of enamel are shaped not only by upgrades in materials, techniques, and structures, but also by the reconfiguration of its cultural significance. Interviews indicate that practitioners generally recognize the continuing value of traditional enamel systems and aesthetic paradigms, particularly in terms of color, symbolism, and cultural narratives, which provide differentiated languages for modern design. However, in practice, "inheritance" is more often understood as *reinterpretation* rather than mere replication—through the integration of cross-cultural visual vocabularies, modern materials, and contemporary fashion contexts, traditional symbols acquire new spaces of meaning. Respondents commonly adopt **hybrid aesthetics strategies**, retaining the refinement of Eastern craftsmanship while incorporating global design expressions, reflecting a concept-driven logic of innovation.

#### ***The fashion system reshapes enamel's cultural function and modes of expression***

Influenced by semiotic and sociological theories, enamel products cease to be static adornments and become visual media encoding stylistic stances and social emotions. Their patterns, colors, and modes of wear are embedded within contemporary contexts of identity politics, subcultural expression, and aesthetic egalitarianism, forming a narrative lexicon rich in political and emotional significance.

#### ***Three design strategies construct a systemic innovation pathway for enamel craft***

The study ultimately synthesizes three design strategies: a symbolic strategy based on the translation of visual culture that reconstructs enamel's aesthetic language; an interactive strategy emphasizing bodily structure and wearing perception that expands its usage scenarios and structural expression; and a craft innovation strategy grounded in material innovation and digital generation, facilitating the iteration of traditional craft within the fashion system.

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**Data Availability Statement:** The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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