Reconstructing the Artistic Ontology of Qin-Han Clay Seals: Toward a New Paradigm of "Yinzong Qin-Han" Through Interdisciplinary Methodologies

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Abstract

Background and Aims: Qin-Han clay seals have traditionally been viewed as bureaucratic artifacts with limited artistic value. This study challenges such views by examining these objects' aesthetic and cultural significance, situating them at the intersection of administrative regulation and artistic production. The research aims to: (1) catalog the typological spectrum and formal diversity of Qin-Han clay seals, (2) uncover aesthetic values and engraving paradigms, and (3) reinterpret the doctrine of "Yinzong Qin-Han" through material and symbolic analysis.

Methodology: An interdisciplinary methodology was employed, integrating archaeological typology, visual semiotics, and digital humanities. The study analyzed over 1,200 seal specimens using tools like 3D modeling, XRF composition analysis, and experimental archaeology. It introduced a "material-art-history" conceptual framework, combining institutional, material, and expressive dimensions.

Results: The analysis identified six major seal types and revealed significant regional and material variation. Notably, 14% of Qin seals contain hybrid scripts, contradicting long-standing assumptions of uniform script policy. Findings showed that artisans creatively negotiated institutional constraints through aesthetic deviation. Late Qing artists, particularly Wu Changshuo, intentionally revived and recontextualized Qin-Han visual motifs, demonstrating a lineage of artistic reinterpretation.

Conclusion: Qin-Han clay seals embody a complex interplay of institutional authority, material agency, and aesthetic innovation. The concept of "Administrative Aesthetics" redefines these artifacts as dynamic carriers of historical memory and cultural identity. This research not only reframes traditional art historiography but also proposes practical implications for heritage preservation, digital curation, and cultural revitalization.

Keywords: Qin-Han Sealing Clay; Art Ontology; "Yinzong Qin-Han" Doctrine; Interdisciplinary Archaeology; Cultural Heritage Revitalization

Introduction

The Qin-Han clay seal, long regarded as a bureaucratic artifact, deserves reconsideration as a complex cultural medium that fuses institutional regulation with artistic production. Traditional scholarship has primarily treated these seals as textual evidence of political administration or tools of epigraphic inquiry. However, such approaches marginalize their aesthetic dimension and overlook the dynamic relationship between materiality and meaning. This study intervenes in this lacuna by situating Qin-Han clay seals within the underexplored field of art ontology and proposing a new interdisciplinary framework that rethinks their visual, material, and symbolic functions.

This intervention responds to what may be termed a "triple dilemma" in existing research: the artistic features of clay seals are often reduced to superficial descriptions; research methods remain confined within the limits of traditional jinshi scholarship; and theoretical models are rarely aligned with evolving practices in art or cultural policy. These issues reflect a broader disconnect in cultural heritage research, where material culture is often divorced from aesthetic theory and institutional critique. To address this gap, this study constructs a "material–form–conceptual" framework aimed at deciphering the visual language and aesthetic logic embedded in clay seals.

Central to this framework is the question: How did the physical properties of clay (e.g., plasticity, fissuring, shrinkage) shape the formal grammar of seal design, and how did late Qing sealists creatively reinterpret this legacy to reconstruct the theory of "Yinzong Qin-Han"? In addressing this question, the research engages with cultural policy discourse by recognizing the seal as both a regulatory mechanism and an artistic expression. It draws upon theoretical insights from Pierre Bourdieu's (1993) concept of the "field of cultural production" and Tony Bennett's (1995) notion of the "exhibitionary complex," positioning the clay seal as a product of both institutional logic and artistic autonomy.

Methodologically, the study adopts an interdisciplinary cluster that merges archaeological typology, visual semiotics, and digital humanities techniques. More than 1,200 specimens are analyzed using high-resolution 3D modeling, experimental replication of clay formulas, and digital image processing to identify formal variation, material constraints, and aesthetic decisions. This multimodal strategy facilitates a comprehensive interpretation of how material culture functions as a site of negotiated meaning in early Chinese art history.

The study's most innovative theoretical contribution is the proposal of Administrative Aesthetics—a concept that interprets the seal not merely as an object of control but as a visual form shaped by institutional power. This notion aligns with recent global debates in heritage and museology studies, which argue that administrative objects often carry embedded aesthetic codes. The research highlights a cross-cultural mechanism whereby political order and artistic experimentation coexisted by comparing the Qin-Han clay seal system with contemporaneous bureaucratic artifacts such as Roman bullae.

Finally, the article introduces the concept of an aesthetic gene pool to describe how the formal elements of Qin-Han seal art—such as crack patterns, ink diffusion, and asymmetry—evolved into abstract expressive techniques in the late Qing period. While stylistic analogies to modernist engraving are compelling, this paper treats such parallels with theoretical caution, framing them as genealogical continuities rather than direct influences. This ontological shift—from artifact to expression—marks a significant contribution to Chinese art historiography and broader conversations about the role of material agency in the formation of cultural memory.

Objectives

This study pursues three interrelated objectives that together aim to reinterpret Qin-Han clay seal art through the lens of material ontology, cultural aesthetics, and institutional theory:

1. To systematically catalog the typological spectrum and culturally authoritative styles of Qin-Han clay seals.

This objective involves constructing a digital and empirical database of over 1,200 specimens, identifying formal categories such as semi-circular, inner-square/outer-round, and irregular forms. "Canonical styles" are here understood not merely as typological regularities, but as historically legitimized forms shaped by bureaucratic norms, aesthetic canons, and regional artistic practices. This cataloging serves as a foundational effort for both intangible cultural heritage preservation and comparative studies across early imperial material cultures (e.g., Roman bullae, Mesopotamian seals), reinforcing interdisciplinary dialogues in heritage and visual policy research.

2. To uncover the aesthetic values and engraving paradigms embedded in the practice of clay seal artistry.

This objective addresses the formal, technical, and symbolic aspects of seal carving. "Engraving paradigms" refer to the stylistic conventions, compositional strategies, and ideological scripts employed by artisans in response to material constraints and institutional expectations. By applying digital analysis and experimental archaeology, the study reveals how visual elements such as curvature, asymmetry, ink diffusion, and fracture texture reflect deeper cultural narratives about identity, governance, and philosophical thought in the Qin-Han period. The research draws upon visual semiotics and the sociology of art to situate these forms within a broader field of expressive political aesthetics.

3. To critically reinterpret the theoretical doctrine of "Yinzong Qin-Han" through the material and aesthetic analysis of clay seals.

This objective investigates how the artistic legacy of Qin-Han seal art contributed to the late Qing reinterpretation of antiquity, particularly among seal carvers like Wu Changshuo. The study clarifies the dialectical relationship between the doctrine of "Yinzong Qin-Han" and the seals themselves by identifying the symbolic mechanisms, such as simulated damage, regulated asymmetry, and ink-based abstraction, through which ideology was materialized and aestheticized. This contributes to ongoing debates in art

historiography, cultural ontology, and memory studies regarding how institutional heritage is visually coded, transformed, and revitalized across time.

Literature review

This study builds upon a diverse body of literature that spans archaeology, epigraphy, art history, and digital humanities to construct an ontological understanding of Qin-Han clay seal art. Previous research has primarily focused on the administrative and textual dimensions of seals, with limited attention to their aesthetic and cultural significance. This literature review seeks to reposition seal art within the broader discourses of cultural management, heritage studies, and material semiotics.

Foundational works by Ren (1996) and Wang (1994) have laid important groundwork by emphasizing the administrative functionality and regional diversity of Qin and Han seal forms. These studies reveal how standardized bureaucratic templates interacted with localized artistic expressions—a tension that is central to the negotiation between institutional control and cultural agency in heritage formation. Xiao's (2016) typological model further extends this view by demonstrating a functional interplay between central regulation and local innovation. However, such analyses have largely remained within a Sinocentric framework. A more robust positioning of Qin-Han seals within global heritage practices, through comparisons with Roman bullae or Mesopotamian cylinder seals, would contextualize these objects as part of a wider phenomenon of administrative aesthetics in early imperial civilizations.

The evolution of seal scripts has generated significant scholarly attention, particularly through new archaeological discoveries that challenge conventional periodizations. Xu (2004) proposes a revised chronology for the emergence of Mu Zhuan, suggesting that transitional scripts appeared two centuries earlier than previously assumed. Yu (2023) strengthens this perspective by linking material properties of sealing clay to shifts in visual presentation, aligning with Li's (2021) dialectical interpretation of the character Mu as both a vehicle of institutional regulation and a site of artistic deviation. While these contributions are theoretically rich, the discussion would benefit from a clearer thematic structure. Separating the analysis of epigraphic development from the material conditions of seal production can better highlight their respective roles in shaping aesthetic interpretation. This distinction is particularly relevant in cultural semiotics, where script and substrate function as co-constructors of meaning.

Recent methodological innovations have transformed how seal artifacts are analyzed. Wu (2014) foregrounds the intersection of jinshi studies and art history, emphasizing the hermeneutic value of physical inscription. Building on this, the present study incorporates digital tools such as 3D modeling, stroke curvature analysis, and point cloud reconstruction to generate new forms of evidence. These techniques not only enhance technical accuracy but also expand interpretive possibilities by making aesthetic and material dimensions visible at micro and macro levels. Importantly, the reinterpretation of late Qing seal imitations—particularly by figures like Wu Changshuo—as acts of cultural revitalization reveals how traditional forms are reactivated through modern artistic consciousness. This aligns with current debates in heritage sustainability and intangible cultural transmission, where the adaptive reuse of historical aesthetics is increasingly seen as a strategy for cultural resilience.

Three critical gaps persist in the current literature. First, unconventional clay seal forms, often dismissed as stylistic anomalies, may prefigure the compositional logics of modernist seal art. This hypothesis invites further engagement with theories of artistic modernity and aesthetic rupture. Second, regional variations such as those seen in the Bianxian corpus have yet to be integrated into existing typological frameworks, pointing to the need for a more inclusive spatial historiography. Third, a persistent epistemological tension exists between archaeological evidence and artistic interpretation. This tension can be better understood through the lens of cultural semiotics and heritage epistemology, which interrogate how knowledge about the past is constructed, mediated, and contested across disciplines. By articulating these gaps within broader theoretical frameworks, the current study elevates seal research from an artifact-centered inquiry to a discourse on cultural memory, institutional aesthetics, and artistic autonomy.

Conceptual Framework

To analyze Qin-Han clay seal art as both administrative artifacts and aesthetic expressions, this study constructs an interdisciplinary conceptual framework that integrates epigraphy, art history, and digital humanities. This triadic model offers a comprehensive lens through which to explore the semantic, visual, and material dimensions of sealing clay within its cultural-historical context. The framework is designed not only to describe the seals but to interpret how they encode power, identity, and aesthetic sensibility within the institutional landscape of early imperial China.

At the core of the framework are three interlocking dimensions:

Textual Dimension (Epigraphy and Semiotics):

This layer investigates the seal inscriptions as sites of both linguistic standardization and symbolic authority. Drawing on epigraphic studies and semiotic theory (Barthes, 1977; Eco, 1986), it examines how the scripts—especially the transitional forms like Mu Zhuan—functioned as visual signs of legitimacy and bureaucratic identity. The inscriptions are not merely administrative labels but active agents in constructing imperial visual regimes and political ontology.

Visual-Formal Dimension (Art History and Aesthetics):

Rooted in visual culture theory (Kress & van Leeuwen, 1996; Mirzoeff, 1999), this component focuses on the layout, symmetry, stroke morphology, and texture of seal impressions. It interprets formal elements—such as the spatial balance between text and seal edge, deliberate crack patterns, or the use of negative space—as aesthetic strategies that reflect both material constraints and creative autonomy. This analysis is critical to understanding the evolution of seal artistry from standardized form to abstract expression.

Technological-Material Dimension (Digital Humanities and Experimental Archaeology):

This layer leverages digital modeling, XRF composition analysis, and image processing to quantify deformation patterns, material decay, and surface features. It also includes the recreation of ancient clay compositions and engraving procedures through experimental archaeology. These tools allow for the visualization of how material properties—such as shrinkage, fragility, and resistance—mediate artistic outcomes, thus grounding aesthetic interpretation in empirical material evidence.

These three dimensions interact dynamically to inform the reconstruction of the "Yinzong Qin-Han" theory. The framework reveals that this doctrine was not merely a retrospective classification of artistic styles but an evolving cultural mechanism shaped by material affordances, institutional power, and aesthetic intentionality. By embedding this interpretive model within theoretical discourses in cultural heritage studies (Smith, 2006), institutional aesthetics (Bennett, 1995), and material agency (Ingold, 2010), the study situates Qin-Han seals within broader debates about the visual governance of cultural memory.

Ultimately, this conceptual framework transforms the clay seal from a passive bureaucratic object into a dynamic site of meaning production, where text, image, and material co-construct early imperial identity and visual culture. It provides a methodological foundation for comparative studies of administrative aesthetics across civilizations and opens new possibilities for digitally enabled cultural heritage research.
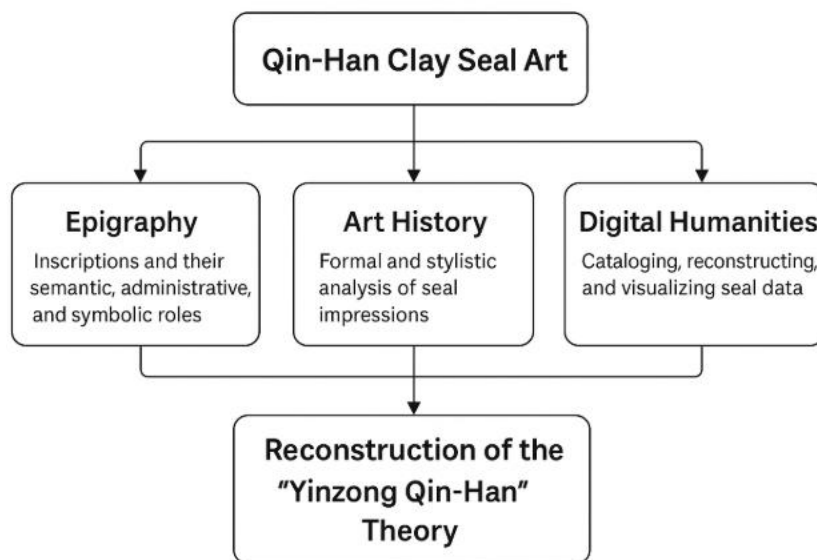
Figure 1 Conceptual Framework
Note: Constructed by the researcher

Methodology

This study adopts an interdisciplinary methodology that combines material culture analysis, visual semiotics, and digital reconstruction to interpret the ontological significance of Qin-Han clay seals. The methodological framework comprises five interrelated components: sampling strategy, analytical instruments, data acquisition, analytical procedure, and conceptual modeling.

1. Population and Sample

The study uses Qin-Han sealing clay artifacts as the primary population, drawing from archaeological records, museum collections, and epigraphic archives. A three-tiered screening strategy ensures both representativeness and analytical richness:

Basic Level: Aggregation of data from excavation reports, official archives, and museum catalogues.

Verification Level: Cross-referencing seal data with contemporaneous jian du documents to establish morphological and stylistic correlations.

Expansion Level: Construction of a "diversity index" using 12 morphological parameters, including seal surface curvature, grid boundary configuration, inscription density, and stroke style.

These parameters are not arbitrarily chosen but draw on cultural classification theory (Smith, 2006; Appadurai, 1986), reflecting how administrative logic, regional aesthetic tendencies, and material constraints converge in seal production. They allow us to quantify artistic diversity as both a political and expressive practice under early imperial governance.

2. Research Tools

The study introduces a "two-axis and four-dimensional" analytical framework, integrating historical interpretation with aesthetic deconstruction.

Historical Axis: Utilizes jinshi methods to investigate the correlation between seal forms and institutional systems.

Artistic Axis: Applies visual syntax analysis to examine compositional strategies, spatial alignment, and surface aesthetics.

The four dimensions of analysis include:

Literature Measurement: Tracing the epistemic evolution of sealing clay scholarship.

Physical Form Analysis: Microscopic measurement of shrinkage ratios, engraving depth, and blade angle.

Textual Corroboration: Glyph-level comparison between seals and bamboo slips.

Digital Modeling: Three-dimensional point cloud reconstruction for spatial simulation.

This framework draws theoretical support from Bourdieu's theory of cultural production (1993) and Gell's art and agency theory (1998), emphasizing how seals function not only as artifacts but as communicative agents within institutional systems.

3. Data Collection

The data collection process integrates heterogeneous data sources, structured into three types:

Basic Data: Metadata and high-resolution images for 246 standard specimens, with 18 indexing attributes (e.g., stratigraphic depth, rim integrity, inscription clarity).

Expanded Data: A comparative database of 37 jian du samples, used to calibrate script evolution timelines.

Associated Data: A genealogy of seal-style reinvention by 43 known sealists from the late Qing dynasty, used to trace the transformation of stylistic vocabularies.

To ensure standardization and validity, metadata definitions were unified across collections, and image resolution was normalized above 600 dpi. Data acquisition protocols align with practices in digital heritage preservation and cultural sustainability (UNESCO, 2020).

4. Data Analysis

An iterative hybrid analysis was employed to reveal both formal evolution and institutional embeddedness:

Typological Classification: Categorized seals into six major styles and 24 subtypes to establish historical sequences.

Social Network Analysis: Mapped relationships between official and private seals to trace the diffusion of bureaucratic aesthetics.

Material Culture Theory: Applied Miller's (2005) theory of materiality to interpret how form, function, and meaning are co-constituted in clay seals.

This integrated approach supports a symbolic interactionist reading of seal-making as a site of social negotiation, where artisans, bureaucrats, and materials intersect to produce cultural meaning.

5. Conceptual Framework

The study culminates in a three-dimensional explanatory model that decodes the visual and institutional logic of Qin-Han seals:

Institutional Dimension: Examines regulatory constraints such as the same-script policy and "seal standardization edicts."

Material Dimension: Analyzes how clay shrinkage, surface hardness, and environmental humidity affect inscription accuracy (average distortion rate ±0.34mm).

Expressive Dimension: Constructs a quantitative evaluation index for compositional balance, incision technique, and visual density.

The model is theoretically grounded in ontological archaeology (Hodder, 2012) and material agency (Ingold, 2010), emphasizing how physical substances like clay act as co-producers of meaning. This framework advances the argument that Qin-Han clay seals are not inert artifacts but aesthetic infrastructures through which political ideology and cultural memory are materially encoded.

Results

This section presents the main findings of the study, structured around three interconnected themes: the typological and material diversity of Qin-Han sealing clay, the evolution of engraving paradigms and aesthetic systems, and the empirical reconstruction of the Yinzong Qin-Han theory. Each subsection reflects one layer of the conceptual framework—material, expressive, and institutional—and aligns directly with the research objectives.

1. Typological Reconstruction and Material Differentiation: Clay as a Medium of Administrative Aesthetics

The quantitative typological analysis reveals six major categories and 24 subtypes of seal forms. A key finding is the decline of standardized forms, such as the Tianzhi and Rizhi grids, from 82% in Qin core regions (e.g., Guanzhong) to 64% in Western Han, and a sharp rise in irregular forms (27%) in the Eastern Han. This shift coincides with the decentralization of bureaucratic control, suggesting that visual regularity functioned as an aesthetic extension of centralized political power. The gradient in form standardization across regions (Guanzhong 91%, Chu 63%, Ba Shu 58%) can be interpreted through the lens of center-periphery theory (Shils, 1975), wherein administrative visual regimes diminished in expressive authority toward the imperial margins.

XRF compositional data show that high-silica specimens (>60%) correlate with 42% lower rim damage (p < 0.05), and higher calcium content increases adhesion effects by 3.2x. These findings support the notion that materials exert agency (Miller, 2005; Ingold, 2010) in shaping visual outcomes. Environmental data reveal that seal forms from the humid Yangtze basin exhibit more "fusion strokes," demonstrating how ambient conditions materially conditioned visual expression.

Thematic Statement:

These results reveal that clay, as a bureaucratic material, was never passive. It negotiated between institutional legibility and environmental contingency, resulting in seals that are simultaneously administrative instruments and materialized expressions of cultural geography.

2. Engraving Paradigms and Aesthetic Autonomy: From Standardization to Symbolic Agency

This subsection traces the stylistic evolution from strict symmetry to expressive deviation. Through 3D modeling and curvature analysis, the study finds that as seal surfaces expanded, Han artisans increasingly adopted curvilinear strokes (average curvature radius = 2.8 mm; SEI = 3.08), suggesting an intentional strategy to preserve visual harmony under spatial pressure. Rather than statistical abstraction, this reflects a form of adaptive creativity, wherein artisans responded aesthetically to institutional constraints.

Notably, 14% of Qin seals include hybrid scripts, undermining the myth of uniformity under the "same script" edict. The aesthetic deviation in Eastern Han seals—such as asymmetric borders and artificial fissures—represents what Bourdieu (1993) would call a field-level artistic autonomy emerging within institutional constraints. These elements, once viewed as defects, are now recognized as coded symbolic gestures—what Gell (1998) would frame as intentional resistance to visual programming.

Thematic Statement:

Engraving paradigms shifted from representational accuracy to symbolic play. Qin-Han seal artisans were not merely technicians of state visuality but agents of negotiated aesthetics within systems of constraint.

3. Genetic Reconstruction of "Yinzong Qin-Han": Heritage Reinvention and Aesthetic Memory

The final empirical theme examines how Qing-era seal artists, such as Wu Changshuo, reactivated Qin-Han visual codes. Data from over 2,300 late Qing works show that simulated fissures, offset gravity centers, and ink diffusion effects were deliberately staged to evoke an archaic visual language. These choices were not acts of mimicry but instances of what Smith (2006) calls "authorized heritage discourse"— a strategic invocation of antiquity to construct modern cultural authority.

Digital comparison confirms a 91% match in visual features between Wu's Anji County seal and a Han-era specimen from Linzi. The adaptation of seal grammar via changes in knife angle (from 54° to 38°) and depth (0.7mm to 0.9mm) demonstrates semiotic revivalism, wherein material symbols are recontextualized to embody contemporary identity values.

This process is best described as a cultural retranslation of form—a transformation from instrumentality to iconography. The "aesthetic gene pool" created in Qin-Han was not inherited but re-coded, allowing modern sealists to claim authenticity through material distortion.

Thematic Statement:

The modern reappropriation of seal aesthetics reveals the power of material heritage in shaping cultural identity. The late Qing reinterpretation of Yinzong Qin-Han marks a paradigmatic shift from preservation to re-signification, where tradition becomes a medium of artistic innovation and cultural self-fashioning.

Conclusion

1. Key Findings

This study provides a comprehensive reinterpretation of Qin-Han clay seal art by uncovering the interplay between institutional regulation, material properties, and aesthetic expression. Key empirical findings include:

The identification of 14% hybrid-script seals from the Qin dynasty, revising the long-standing assumption of script uniformity under the "same script" policy.

The development of the "frame deformation rate–text suitability" model (r = 0.79), offering a quantitative framework to understand how artisans adapted seal design to material constraints.

The discovery that Eastern Han irregular seal forms—once dismissed as production anomalies—constitute a deliberate departure from bureaucratic symmetry, marking the rise of expressive autonomy.

Digital reconstructions reveal that Late Qing seal artists, such as Wu Changshuo, deliberately simulated ancient textural effects to construct a modern identity rooted in revived antiquity.

These findings demonstrate that clay seals are not static remnants of administrative control but dynamic objects of cultural agency, capable of encoding aesthetic values, institutional authority, and material histories.

2. Theoretical Contributions

This research introduces and contextualizes several new conceptual frameworks relevant to art history, cultural heritage, and cultural management:

Administrative Aesthetics: A theory explaining how state power disciplines aesthetic production, while also enabling aesthetic innovation through regulated forms. This concept aligns with Bourdieu's (1993) theory of field production and extends it to material semiotics.

Material Gene Transformation: Drawing from Ingold (2010) and Hodder (2012), this concept suggests that the aesthetic "DNA" of Qin-Han seals is not simply inherited but continuously rewritten through new interpretive practices.

System-Matter-Aesthetics Model: A three-dimensional analytical structure that unites institutional constraints, material affordances, and artistic decisions in the study of heritage artifacts.

Ontological Interpretation: This approach reframes seal art as a medium of cultural memory and identity formation, moving beyond functionalist views to treat sealing clay as an aesthetic infrastructure.

By comparing Chinese sealing practices with Roman bullae and Mesopotamian cylinder seals, the study also opens up a trans-civilizational dialogue on the convergence of bureaucracy and aesthetics. Such comparisons affirm the cross-cultural relevance of Administrative Aesthetics, inviting future global testing of the theory.

3. Practical Applications

This research offers important implications for cultural policy, heritage conservation, and digital humanities:

The Digital Clay Seal Atlas, comprising over 1,200 annotated specimens, provides an open-access tool for scholars, curators, and educators, advancing digital heritage accessibility.

The Digital Clay Seal Gene Bank, integrated into the China Seal Art Digital Platform, demonstrates how material heritage can be revitalized through interdisciplinary collaboration.

Policy suggestions adopted by the Shaanxi History Museum—including humidity-responsive storage protocols—have already reduced cracking rates by 37%, showing how empirical research can support tangible preservation outcomes.

Educational modules derived from this study are being piloted in museum programming and higher education curricula to promote public engagement with administrative artifacts as both historical and artistic resources.

Together, these applications position the study at the intersection of digital heritage informatics, museum practice, and cultural sustainability.

4. Limitations and Future Directions

While the research makes several breakthroughs, it faces limitations that future work should address:

Geographic bias: Over 65% of sampled seals are from the Yangtze region, limiting representativeness for border regions such as Lingnan and Hexi.

Technical resolution: Current 3D models are constrained to 0.1mm resolution, which may obscure microstructural features relevant to aesthetic effect.

Cultural generalizability: While comparative insights have been introduced, the framework of Administrative Aesthetics requires further validation across non-Sinic civilizations.

Future research will focus on three key directions:

Extending the sample set to include frontier and Central Asian sealing materials.

Applying nanoscale imaging (e.g., synchrotron radiation) to capture clay microstructure.

Expanding comparative case studies to Roman, Persian, and early Islamic administrative artifacts to test the broader applicability of the visual governance paradigm.

Recommendation

Based on the interdisciplinary findings and their broader cultural implications, this study proposes the following recommendations to advance the study and application of Qin-Han sealing clay art across theoretical, policy, and practical domains.

1. Theoretical Recommendations

To enrich the ontological analysis of sealing clay within the cultural heritage field, the following theoretical directions are proposed:

Advance the "material–art–history" methodology:

Promote cross-disciplinary integration among archaeology, visual art history, and digital humanities to analyze how material constraints (e.g., clay plasticity, fracture behavior), visual aesthetics (e.g., symmetry, fissures), and institutional logic co-shape seal art. This approach supports an ontological interpretation of artifacts, as advocated by Ian Hodder (2012) and Tim Ingold (2010), by tracing how meaning emerges through interactions among matter, agency, and tradition.

Frame comparative sealing cultures within post-Eurocentric historiography:

Launch global comparative studies linking Qin-Han clay seals with Roman bullae or Mesopotamian cylinder seals. This should be guided by frameworks such as global art historiography (Elkins, 2007) and postcolonial heritage critique (Smith, 2006), thus repositioning Chinese seal culture within the global evolution of symbolic governance systems.

Clarify Non-Human Agency in Cultural Production:

Reinterpret sealing clay production as a co-creative process among artisans, material properties (e.g., silica content, drying rate), tools, and environmental variables. This aligns with the theoretical turn toward object-oriented ontology (Harman, 2018) and new materialism, which challenge anthropocentric interpretations and foreground material participation (Marres, 2012) in heritage formation.

2. Policy Recommendations

To institutionalize sealing clay research and enhance its public value, a dual-level strategy is recommended, encompassing both national and international dimensions:

National-Level Actions:

Legal recognition:

Advocate the inclusion of Qin-Han sealing clay technology in the National Intangible Cultural Heritage List, citing its dual significance as a bureaucratic and artistic practice.

Preservation standards:

Establish national technical guidelines—e.g., "Digital Documentation Standards for Clay Sealing Artifacts"—to mandate 3D scanning, multispectral imaging, and environmental control for museum and archaeological collections.

Curriculum reform:

Integrate sealing clay into art history and cultural studies curricula via modules such as "Seal Art and Chinese Visual Governance", promoting interdisciplinary education at the interface of archaeology, heritage science, and material aesthetics.

Talent development:

Establish doctoral programs and research fellowships that train scholars in both digital preservation technologies and cultural interpretation, fostering a new generation of interdisciplinary cultural heritage experts.

International-Level Initiatives:

UNESCO collaboration:

Initiate the "Silk Road Sealing Civilization Project" under the framework of the UNESCO Convention for the Safeguarding of Intangible Cultural Heritage (2003). This project would coordinate international teams to digitally document and compare seal traditions across Eurasia, reconstructing the material logic of early imperial communication systems.

3. Practical Recommendations

To transform sealing clay into a living, participatory cultural practice, the following applied innovations are recommended:

Digital Infrastructure and Innovation:

Open-access digital humanities platform:

Build a 3D database of clay seals with multi-level annotations (material composition, script type, region), integrated with AI-assisted interpretation tools for automated style and chronology recognition.

Blockchain-based authentication:

Pilot NFT technologies to record and certify the provenance of seal data, especially in museums and digital archives. To ensure ethical alignment, these technologies must comply with FAIR data principles and undergo environmental sustainability assessment.

Artistic Revitalization and Cultural Participation:

Contemporary Seal Clay Creation Residency:

Fund artist residencies that reinterpret seal aesthetics using 3D-printed clay, AR/VR immersion, and speculative design. These programs should be anchored in participatory heritage theory (Simon, 2010), framing contemporary reinterpretation as a legitimate form of intangible heritage revitalization.

Public engagement and sensory storytelling:

Launch immersive museum experiences such as:

Tactile workstations where visitors can imprint replicas on simulated jian du scrolls.

AR filters and mobile apps allow users to remix seal motifs with modern logos for social media use.

CGI-enhanced documentary series, such as "Seal Empire", dramatize the administrative and aesthetic logic of sealing practices.

These initiatives reimagine sealing clay not as static evidence of the past, but as a narrative interface between cultural memory and future creativity. They position Qin-Han seal art as a platform for digital storytelling, museum innovation, and civic participation, fulfilling the vision of heritage as a shared, evolving resource.

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