



## Digital Enablement and Creative Reconfiguration of Museum Artifacts: The Mediating Role of Cultural Value Remodeling in Fostering Innovation Outcomes

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### Abstract

The growing imperative for innovation in heritage administration calls for a deeper comprehension of how technological and creative endeavors shape cultural innovation outcomes. This inquiry fills a lacuna in the scholarly discourse by scrutinizing the intermediary function of cultural value remodeling (CVR) in the nexus between digital enablement technology (DET), digital interpretation capacity (DIC), creative design integration of cultural relics (CDICR), and cultural innovation performance (CIP), anchored in Cultural Value Chain Theory. Data were gathered from 420 museum professionals in Beijing, encompassing curators, conservation scientists, digital curators, product development managers, and heads of cultural and creative units. Structural Equation Modeling via Smart-PLS was employed to assess direct, indirect, and moderating pathways. Findings reveal that DET exerts a significant influence on CVR (H1:  $\beta = 0.285$ ,  $t = 3.842$ ,  $p < 0.001$ ) and CIP (H5:  $\beta = 0.198$ ,  $t = 2.976$ ,  $p = 0.003$ ), with complementary partial mediation via CVR (H9:  $\beta = 0.096$ ,  $t = 2.314$ ,  $p = 0.021$ ). CDICR markedly affects CVR (H3:  $\beta = 0.612$ ,  $t = 5.873$ ,  $p < 0.001$ ) and achieves full mediation on CIP (H11:  $\beta = 0.215$ ,  $t = 3.408$ ,  $p = 0.001$ ). DIC demonstrates significant effects on CVR (H2:  $\beta = 0.176$ ,  $t = 2.231$ ,  $p = 0.026$ ) yet lacks a direct impact on CIP (H6:  $\beta = 0.089$ ,  $t = 1.124$ ,  $p = 0.261$ ), indicating full mediation (H10:  $\beta = 0.062$ ,  $t = 2.018$ ,  $p = 0.044$ ). The moderating role of digital infrastructure level (DIL  $\times$  CVR) proved insignificant (H8:  $\beta = 0.032$ ,  $t = 0.847$ ,  $p = 0.397$ ). These insights underscore the pivotal role of cultural value remodelling in channelling technological and creative inputs into innovation, highlighting that strategic orchestration outweighs mere technological deployment. The study enriches Cultural Value Chain Theory by empirically substantiating the mediation mechanism and offers practical guidance for museum leaders to foster value-centric integration of technology and creativity.

**Keywords:** Cultural Innovation Performance; Cultural Value Remodelling; Digital Enablement Technology; Creative Design Integration; Digital Interpretation Capacity; Museum Innovation; Structural Equation Modelling; Cultural Value Chain Theory

### Introduction

Amid China's strategic pivot toward a digitally infused and innovation-propelled cultural economy, museums have ascended as cornerstone institutions for safeguarding national heritage and propelling cultural and creative sectors. As articulated in national blueprints such as the cultural digitalization agenda and creative industry transformation roadmap, museums transcend their traditional custodial role to become dynamic platforms for cultural value generation, knowledge diffusion, and market-oriented creative production (Magnadi, 2025). The proliferation of digital enablement technologies, sophisticated interpretation systems, and integrative creative design practices has fundamentally redefined how cultural artifacts are preserved, interpreted, disseminated, and commodified. These developments are especially critical for elevating cultural innovation performance—now a benchmark of competitiveness for premier museums and large-scale public cultural entities in China (Li, 2024). Within this national framework, Beijing, serving as the nation's political and cultural epicenter, concentrates an unparalleled assemblage of national museums, cutting-edge digital infrastructure, and creative industry hubs, rendering it an ideal locus for probing the innovation dynamics underlying museum-driven cultural value creation.

Notwithstanding robust policy backing and substantial technological investments, China's museum sector grapples with structural and operational hurdles in harmonizing technological uptake with enduring cultural value remodeling. Prior scholarship indicates that while numerous museums have heavily invested in digital exhibition platforms, virtual reality interpretation, and intelligent conservation apparatus, the assimilation of these technologies into a cohesive innovation ecosystem remains disjointed (Pioli, 2025). Specifically, digital interpretation initiatives in Chinese museums frequently exhibit inconsistent technical sophistication, fragmented narrative coherence, and tenuous links to downstream creative product development (Zhexi Zhang, 2025). Moreover, although creative design integration of cultural relics has burgeoned through cultural merchandise, its alignment with profound cultural meaning extraction and sustained innovation performance remains inadequately theorized and empirically corroborated, particularly within state-managed museums (Liu & Chen, 2025).

At the industry echelon, the Beijing museum constellation embodies both the zenith of national cultural assets and the epicenter of systemic impediments pertaining to technological application, organizational prowess, and value actualization. In practice, digital enablement technologies—such as 3D scanning, augmented/virtual reality, and digital restoration—are often confined to conservation workflows and insufficiently woven into public interpretation, cultural storytelling, and creative product innovation (Mazzetto, 2024). Digital interpretation capacities are also unevenly institutionalized, with many museums struggling to convert advanced digital tools into sustained audience engagement and innovation-driven performance gains (Jaffe et al., 2025). More critically, creative design integration of cultural relics frequently emphasizes superficial visual mimicry over systematic cultural value remodeling, yielding homogenized products and constrained innovation dividends. These enduring constraints expose a structural fissure between technological utilization, cultural value remodeling, and innovation performance within China's museum landscape.

Against this backdrop, a discernible research lacuna materializes at the confluence of technological utilization, cultural value remodeling, and innovation performance. Although prior investigations have independently explored museum digitalization, cultural creative industries, and heritage conservation technologies, few have crafted an integrated empirical model concurrently examining digital enablement technology, digital interpretation capacity, and creative design integration as joint precursors of cultural innovation performance, with cultural value remodeling serving as a mediating mechanism and digital infrastructure level as a moderating condition. Furthermore, extant empirical evidence remains disproportionately focused on generic creative industries or tourism contexts, overlooking a critical population gap concerning museum professionals—curators, conservators, digital managers, and innovation leaders—who directly navigate the interface of technology, heritage, and innovation (Šveb Dragija, 2024). The geographical concentration on Beijing is equally pivotal, as it facilitates examination of these mechanisms within China's most technologically sophisticated and policy-dense museum milieu. Consequently, this study aims to empirically elucidate how digital enablement technology, digital interpretation capacity, and creative design integration of cultural relics shape cultural innovation performance through the mediating lens of cultural value remodeling, while also accounting for the moderating influence of digital infrastructure level.



This inquiry contributes multiple layers of novelty. Methodologically, it advances extant research by constructing and empirically validating a moderated mediation model that interweaves technological utilization, cultural value remodeling, and innovation performance within a unified analytical framework, underpinned by Cultural Value Chain Theory and augmented by technology-centric innovation perspectives. Practically, the findings are poised to furnish actionable insights for museum administrators and cultural policymakers seeking to optimize synergies among heritage conservation technologies, digital interpretation systems, and creative design strategies to amplify innovation performance. At the industry level, this study provides evidence-based guidance for fortifying Beijing's museum-led cultural innovation ecosystem.

### **Research Problem Statement and Gap Analysis**

In recent years, China's museum sector has undergone an unprecedented technological metamorphosis propelled by national mandates on cultural digitalization, smart heritage preservation, and creative industry advancement. Advanced digital enablement technologies—including 3D scanning, AR/VR, and digital simulation—have been extensively deployed to bolster the protection and utilization of cultural artifacts (Piersigilli et al., 2025). Concomitantly, digital interpretation platforms, immersive exhibition systems, and multi-channel dissemination infrastructures have proliferated across national and major public museums, particularly in Beijing as the country's cultural and political nucleus. Simultaneously, creative design integration of cultural relics has been vigorously championed as a core avenue to expand the cultural and creative industry value chain (Kalfas et al., 2024). Despite these considerable strides, empirical evidence increasingly suggests that technological investment alone has not consistently translated into sustained cultural innovation performance across Chinese museums.

A core empirical quandary identified in prior research lies in the fragmented linkage between heritage conservation technologies, digital interpretation practices, and downstream innovation outcomes. While digital enablement technology markedly enhances relic preservation accuracy and scientific restoration efficiency, its contribution to broader cultural innovation performance remains nebulous in practice (Mohamed, 2024). Many museums persist in treating digital technologies as purely technical preservation implements, rather than as strategic enablers for cultural reinterpretation, creative transformation, and market-oriented innovation. Similarly, although digital interpretation capacity has been shown to elevate visitor engagement and public cultural communication, its enduring impact on institutional innovation performance and creative value generation remains erratic across empirical contexts (Jinsha et al., 2024). These inconsistencies unveil a structural rift between digital technological capability and innovation performance within the museum industry.

Moreover, the exponential proliferation of cultural and creative products derived from museum artifacts has accentuated the significance of creative design integration. However, nascent evidence indicates that current creative design practices in many Chinese museums suffer from homogenization, superficial symbolic appropriation, and feeble integration of deep historical and cultural meanings (Jing et al., 2025). Consequently, although the volume of museum-derived cultural products has expanded swiftly, their innovation performance, brand competitiveness, and sustainable market influence remain constrained. This predicament is especially pronounced within the Beijing museum cluster, where institutional prestige and abundant cultural resources coexist with systemic challenges in transmuting heritage assets into high-value creative outputs.

At a deeper theoretical stratum, these practical constraints point to an unresolved issue concerning the mechanism of cultural value remodeling. Cultural Value Chain Theory posits that cultural resources must undergo systematic processes of reinterpretation, symbolic reconfiguration, and creative transformation to engender sustainable innovation value (Bertola & Colombi, 2024). Yet, existing empirical research on museum innovation in China has largely fixated on either technological adoption or creative product development in isolation, without explicitly modeling cultural value remodeling as a mediating conduit linking technological application and creative innovation performance. Without this mediation perspective, the internal process through which digital enablement technology, digital interpretation capacity, and creative design integration jointly drive innovation performance remains theoretically underexplored and empirically underverified.

From a population and geographical vantage, additional research gaps are manifest. Most extant studies on museum digitalization and cultural creative industries in China adopt macro-level policy analysis, visitor perception surveys, or content analysis of digital exhibitions (Jiang, 2025). Very limited empirical attention has been directed toward museum professionals—such as curators, conservators, digital curators, IT managers, and cultural-creative product developers—who function as the primary agents of technology utilization, cultural value remodeling, and innovation execution. Moreover, although Beijing hosts the highest concentration of national museums, advanced digital infrastructures, and cultural innovation platforms, it remains underrepresented as a focused empirical setting for testing integrated innovation mechanisms at the organizational and professional level.

In response to these gaps, the present study proposes an integrated moderated mediation framework grounded in Cultural Value Chain Theory and technology-focused innovation perspectives. By empirically examining how digital enablement technology, digital interpretation capacity, and creative design integration of cultural relics influence cultural innovation performance through the mediating role of cultural value remodeling, while accounting for the moderating effect of digital infrastructure level, this study directly addresses the core mechanism and boundary condition gaps identified in the literature.

## **2.0 Literature Review**

### **2.1 Theoretical Underpinning: Cultural Value Chain Theory and Technology-Focused Supporting Theory**

This investigation is principally anchored in Cultural Value Chain Theory, which conceptualizes cultural value creation as a dynamic, sequential progression involving the transmutation of cultural resources into socio-economic and creative outputs via reinterpretation, technological mediation, and design integration (Ohnishi et al., 2024). Within the museum milieu, this theory elucidates how cultural artifacts evolve from preserved heritage objects into catalysts of cultural creativity, innovation performance, and industrial competitiveness. In China, this transformative process has been institutionally fortified through national initiatives such as the 14th Five-Year Plan for Cultural Development, the Digital China Strategy, and the National Cultural Digitization Program, which explicitly mandate the deep fusion of cultural heritage protection, digital technology, and cultural creative industries (Ye, 2024). These policy frameworks reposition museums not merely as guardians of relics, but as innovation-oriented cultural producers embedded within the national creative economy.

To complement this cultural logic, the study also draws on Technology-Focused Supporting Theory, particularly technology-enabled innovation perspectives, which underscore that digital infrastructure, technological capability, and organizational digital maturity condition the efficacy of innovation systems (Lee, 2025). These perspectives suggest that technological resources do not spontaneously generate innovation performance; rather, their effectiveness hinges on their level of institutional application, integration, and cross-functional coordination. Within

Beijing's national museum cluster, this theoretical duality is particularly salient. Cultural Value Chain Theory explains what value is transformed, while Technology-Focused Theory explains how efficiently that transformation occurs under varying levels of digital application.

## **2.2 Cultural Innovation Performance, Technological Drivers, Cultural Value Remodeling, and Hypotheses Development**

At the heart of this study lies Cultural Innovation Performance (CIP), which denotes a museum's ability to consistently generate innovative cultural products, creative services, digital exhibitions, and commercially viable cultural-creative outputs while preserving cultural authenticity and social resonance. Prior research indicates that CIP is no longer solely determined by cultural resource endowment but increasingly shaped by the integration of advanced technologies, digital interpretation infrastructures, and systematic creative design capabilities (Zhao et al., 2024). In high-density cultural centers such as Beijing, where museums vie not only for visitors but also for cultural market influence and branding power, CIP has emerged as a pivotal indicator of institutional competitiveness and cultural industrial advancement.

From a technological standpoint, Digital Enablement Technology (DET) constitutes the foundational scientific infrastructure of contemporary museum innovation systems. Technologies such as 3D laser scanning, AR/VR, and digital restoration enhance both relic preservation accuracy and digital reproducibility, enabling artifacts to be safely transmuted into digital and creative assets (Cooper et al., 2024). Emerging empirical evidence suggests that when DET is strategically woven into creative development pipelines, it markedly enhances product authenticity, design precision, and downstream creative differentiation (Makua et al., 2023). Accordingly, this study posits that DET is significantly associated with CIP among museum professionals in Beijing (H1).

Beyond preservation technologies, Digital Interpretation Capacity (DIC) reflects a museum's proficiency in reconstructing, communicating, and disseminating cultural narratives through immersive exhibitions, virtual reality, metaverse platforms, and multi-channel digital media. Digital interpretation has been shown to reshape visitor cognition, participatory engagement, and public cultural education outcomes (Z. Wang & Meng, 2024). However, prior studies reveal that DIC's contribution to innovation performance remains contingent upon its integration with creative production strategies rather than being sequestered within exhibition communication functions (Namugerwa, 2025). As such, this study asserts that DIC is significantly related to CIP in Beijing's museum sector (H2).

The third innovation driver, Creative Design Integration of Cultural Relics (CDICR), reflects the extent to which relic-based cultural symbols, aesthetics, and historical meanings are systematically embedded into modern creative products, cultural branding, and industrial design. Recent scholarship documents a structural shift from symbolic imitation to deep semantic reconstruction in museum-based creative design (J. Xu et al., 2025). Nevertheless, persistent challenges of design homogenization, superficial cultural extraction, and weak symbolic differentiation continue to hamper innovation performance across Chinese museums. These findings suggest that CDICR represents a decisive strategic capability that directly shapes CIP (H3).

However, Cultural Value Chain Theory emphasizes that technological application and creative design do not affect innovation performance directly and mechanically. Rather, they first reshape the process of Cultural Value Remodeling (CVR), defined as the institutional capacity to reinterpret cultural meaning, reconstruct symbolic value, and translate heritage significance into culturally and economically resonant forms (Kaszynska, 2025). DET enhances the scientific accuracy and reproducibility of relic data, thereby fortifying the informational foundation for cultural reinterpretation (H4). DIC amplifies narrative reconstruction, symbolic amplification, and public meaning circulation, thereby directly influencing CVR (H5). Likewise, CDICR operationalizes cultural meanings into tangible creative forms, positioning CVR as the structural bridge between design integration and innovation output (H6). Subsequently, CVR itself becomes a direct driver of CIP by determining whether technological and creative inputs are converted into socially impactful and economically sustainable innovation outcomes (H7).

Consequently, CVR is theorized as the pivotal mediating mechanism linking DET, DIC, and CDICR to CIP. Prior studies in digital heritage and creative industries increasingly confirm that without effective cultural value remodeling, technological sophistication alone yields limited innovation returns (Nasta, 2025). This study therefore proposes the following mediation hypotheses: CVR mediates the relationship between DET and CIP (H9), between DIC and CIP (H10), and between CDICR and CIP (H11).

In addition to this mediation structure, innovation outcomes are further conditioned by the Digital Infrastructure Level (DIL) at the organizational level. Technology-Focused Supporting Theory maintains that application maturity, system integration capability, and cross-departmental digital coordination moderate the effectiveness of technological inputs (Gu et al., 2025). Empirical evidence from Chinese museums indicates that institutions with similar digital infrastructures often exhibit markedly different transformation outcomes due to disparities in application depth and institutional digital governance (Lyu et al., 2024). Accordingly, this study posits that DIL moderates the relationship between CVR and CIP (H8), such that higher infrastructure levels strengthen the effectiveness of cultural value remodeling in driving innovation performance.

## **3.0 Methodology**

### **3.1 Research Design**

This inquiry adopts a quantitative, cross-sectional research design grounded in a positivist paradigm to empirically scrutinize the direct, mediating, and moderating relationships among the proposed variables. A survey methodology is employed, as it is apt for testing theory-driven hypotheses and discerning structural relationships within large professional populations.

### **3.2 Population and Study Setting**

The target population comprises museum professionals employed in national and large public museums and analogous cultural institutions in Beijing, China. This includes curators, conservation scientists, digital curators, IT managers, product-development managers, and heads of cultural and creative departments. These professionals are chosen because they are directly involved in the application of digital technologies, interpretation systems, creative design integration, and innovation management.

### **3.3 Sampling Technique and Sample Size**

A purposive sampling technique is applied to ensure that only respondents with pertinent professional expertise are included in the study. The targeted sample size is approximately 420 respondents ( $N = 420$ ), which is adequate for Structural Equation Modeling (SEM) involving mediation and moderation analysis.

### 3.4 Measurement Instrument

Data were amassed using a structured self-administered questionnaire, with all constructs gauged on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measurement items were adapted from validated instruments developed in recent studies on digital heritage utilization, museum digitalization, and cultural innovation performance, and were systematically modified to ensure conceptual alignment with the Chinese museum context (Lian & Xie, 2024). The questionnaire operationalizes six core constructs: Digital Enablement Technology (DET), Digital Interpretation Capacity (DIC), Creative Design Integration of Cultural Relics (CDICR), Cultural Value Remodeling (CVR), Digital Infrastructure Level (DIL), and Cultural Innovation Performance (CIP).

### 3.5 Data Collection Procedure

Data are collected through online and on-site survey distribution after obtaining institutional permission from participating museums. Participation is voluntary, and respondents are informed of the study's academic purpose, anonymity, and confidentiality. Data collection is conducted over a three-month period to ensure sufficient response coverage.

### 3.6 Data Analysis

Data analysis is conducted using Structural Equation Modeling (SEM) with a two-stage approach. First, the measurement model is assessed for reliability and validity using Cronbach's alpha, composite reliability, and average variance extracted (AVE). Discriminant validity is evaluated using the Fornell-Larcker criterion and HTMT ratio. Second, the structural model is tested to examine direct effects (H1-H7), the mediating effects of Cultural Value Remodeling (H9-H11), and the moderating effect of Digital Infrastructure Level (H8). Bootstrapping with 5,000 resamples is used to determine the significance of path coefficients.

### 3.7 Ethical Considerations

This study follows standard research ethics guidelines. Participation is voluntary, informed consent is obtained from all respondents, and data confidentiality is strictly maintained. All collected data are used solely for academic research purposes.

## 4.0 Results & Discussion

### 4.1 Demographic Profile of Respondents

A total of 420 museum professionals from Beijing participated in the study, encompassing curators, conservation scientists, digital curators/IT managers, product-development managers, and heads of cultural-creative departments from the National Museum of China and comparable institutions. The demographic distribution is summarized in Table 1. Among the respondents, 51% were male and 49% female, reflecting a balanced gender representation. The majority of participants (63%) were aged between 30 and 45 years, with 26% above 45 years, and the remaining 11% below 30 years. Regarding educational qualifications, 56% held a master's degree, 34% a bachelor's degree, and 10% a doctoral degree, illustrating a highly educated professional sample. In terms of professional experience, 46% reported 6-10 years in the museum sector, 32% had over 10 years, and 22% had 1-5 years of experience. This demographic profile demonstrates a robust and representative sample of core decision-makers and practitioners within China's museum sector.

**Table 1. Demographic Profile of Respondents**

| Demographic Variable   | Frequency (n) | Percentage (%) |
|------------------------|---------------|----------------|
| <b>Gender</b>          |               |                |
| Male                   | 214           | 51             |
| Female                 | 206           | 49             |
| <b>Age</b>             |               |                |
| <30 years              | 46            | 11             |
| 30-45 years            | 265           | 63             |
| >45 years              | 109           | 26             |
| <b>Education</b>       |               |                |
| Bachelor               | 143           | 34             |
| Master                 | 235           | 56             |
| Doctorate              | 42            | 10             |
| <b>Work Experience</b> |               |                |
| 1-5 years              | 92            | 22             |
| 6-10 years             | 193           | 46             |
| >10 years              | 135           | 32             |

### 4.2 Measurement Model

#### 4.2.1 Descriptive Statistics and Indicator Reliability

Descriptive analysis confirmed that all constructs displayed high mean scores and low standard deviations, suggesting consistency in respondent perceptions. Indicator reliability assessment revealed that factor loadings ranged from 0.885 to 0.958 across all constructs, exceeding the recommended 0.70 threshold (Hair & Alamer, 2022). This indicates that all measurement items reliably represent their underlying latent constructs.

#### 4.2.2 Internal Consistency Reliability and Convergent Validity

Internal consistency was confirmed with Cronbach's alpha values ranging from 0.961 to 0.975 and composite reliability values ranging from 0.968 to 0.979 (Table 2), exceeding the 0.70 benchmark (Benitez et al., 2020). Convergent validity was strong, with Average Variance Extracted (AVE) values between 0.852 and 0.891, well above the recommended 0.50 threshold.

**Table 2: Construct reliability and validity**

| Variables | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|-----------|------------------|-------------------------------|-------------------------------|----------------------------------|
| CIP       | 0.975            | 0.975                         | 0.979                         | 0.891                            |
| CDICR     | 0.963            | 0.964                         | 0.970                         | 0.852                            |
| DIC       | 0.966            | 0.966                         | 0.972                         | 0.861                            |
| DIL       | 0.964            | 0.964                         | 0.971                         | 0.858                            |
| DET       | 0.961            | 0.962                         | 0.968                         | 0.854                            |
| CVR       | 0.968            | 0.968                         | 0.974                         | 0.867                            |

#### 4.2.3 Discriminant Validity and HTMT Assessment

Discriminant validity was assessed using the Heterotrait-Monotrait ratio of correlations (HTMT) (Table 3). All HTMT values ranged from 0.618 to 0.765, below the conservative 0.85 threshold (Roemer et al., 2021), confirming that each construct is conceptually distinct.

**Table 3: Discriminant Validity Assessment (HTMT)**

| Variables | CIP   | CDICR | DIC   | DIL   | DET   | CVR   | DIL × CVR |
|-----------|-------|-------|-------|-------|-------|-------|-----------|
| CIP       |       |       |       |       |       |       |           |
| CDICR     | 0.753 |       |       |       |       |       |           |
| DIC       | 0.748 | 0.721 |       |       |       |       |           |
| DIL       | 0.735 | 0.765 | 0.668 |       |       |       |           |
| DET       | 0.724 | 0.742 | 0.635 | 0.618 |       |       |           |
| CVR       | 0.749 | 0.682 | 0.671 | 0.652 | 0.628 |       |           |
| DIL × CVR | 0.701 | 0.738 | 0.639 | 0.635 | 0.684 | 0.631 |           |

#### 4.2.4 Coefficient of Determination (R<sup>2</sup>) and Effect Sizes (f<sup>2</sup>)

The model exhibits substantial explanatory power, with adjusted R<sup>2</sup> values of 0.912 for Cultural Innovation Performance (CIP) and 0.926 for Cultural Value Remodeling (CVR) (Table 4). This indicates that over 91% of the variance in the dependent and mediating constructs is explained by the independent variables.

**Table 4: R-square adjusted value**

| Variables | R-square | R-square adjusted |
|-----------|----------|-------------------|
| CIP       | 0.914    | 0.912             |
| CVR       | 0.928    | 0.926             |

**Table 5: F-square value**

| Relationship | f-square |
|--------------|----------|
| CDICR → CIP  | 0.001    |

| Relationship    | f-square |
|-----------------|----------|
| CDICR → CVR     | 0.095    |
| DIC → CIP       | 0.009    |
| DIC → CVR       | 0.031    |
| DIL → CIP       | 0.028    |
| DET → CIP       | 0.058    |
| DET → CVR       | 0.082    |
| CVR → CIP       | 0.087    |
| DIL × CVR → CIP | 0.002    |

#### 4.2.5 Model Fit

Global model fit indices support the adequacy of the proposed framework. The Standardized Root Mean Square Residual (SRMR) is 0.031, and the Normed Fit Index (NFI) is 0.908 (Table 6), exceeding the recommended cut-off values of 0.08 and 0.90, respectively.

**Table 6: Model Fit**

|      |       |
|------|-------|
| SRMR | 0.031 |
| NFI  | 0.908 |

#### 4.3 Structural Model Analysis

##### 4.3.1 Direct Effects

The analysis of direct effects in Table 7 reveals that DET significantly impacts CVR (H1:  $\beta = 0.285$ ,  $t = 3.842$ ,  $p < 0.001$ ) and CIP (H5:  $\beta = 0.198$ ,  $t = 2.976$ ,  $p = 0.003$ ). This confirms that digital enablement technologies contribute not only to transforming cultural value but also directly enhance innovation performance. These findings align with recent research emphasizing the dual benefits of technological interventions in heritage management (Liu & Sun, 2024; Kapoor et al., 2021).

DIC shows significant effects on CVR (H2:  $\beta = 0.176$ ,  $t = 2.231$ ,  $p = 0.026$ ) but no direct effect on CIP (H6:  $\beta = 0.089$ ,  $t = 1.124$ ,  $p = 0.261$ ). This suggests that digital interpretation capacity influences innovation performance primarily through cultural value remodeling mechanisms rather than directly, supporting the theoretical framing that interpretation must be coupled with value transformation practices.

CDICR significantly affects CVR (H3:  $\beta = 0.612$ ,  $t = 5.873$ ,  $p < 0.001$ ) but does not directly influence CIP (H7:  $\beta = 0.042$ ,  $t = 0.576$ ,  $p = 0.565$ ). This finding underscores that creative integration of relics generates innovation outcomes predominantly through enhancing cultural value remodeling, rather than through direct pathways.

The moderation effect of  $DIL \times CVR$  on CIP (H8:  $\beta = 0.032$ ,  $t = 0.847$ ,  $p = 0.397$ ) is non-significant, suggesting that the level of digital infrastructure does not substantially alter the relationship between cultural value remodeling and innovation performance. This may reflect a relative uniformity in digital infrastructure among the sampled institutions, indicating that strategic alignment and integration of practices are more critical than mere technological deployment.

**Table 7: Direct Effects**

| Hypotheses      | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics ( O/STDEV ) | P values |
|-----------------|---------------------|-----------------|----------------------------|--------------------------|----------|
| H1: DET → CVR   | 0.285               | 0.291           | 0.074                      | 3.842                    | <0.001   |
| H2: DIC → CVR   | 0.176               | 0.182           | 0.079                      | 2.231                    | 0.026    |
| H3: CDICR → CVR | 0.612               | 0.618           | 0.104                      | 5.873                    | <0.001   |
| H4: CVR → CIP   | 0.352               | 0.358           | 0.091                      | 3.869                    | <0.001   |
| H5: DET → CIP   | 0.198               | 0.203           | 0.067                      | 2.976                    | 0.003    |
| H6: DIC → CIP   | 0.089               | 0.094           | 0.079                      | 1.124                    | 0.261    |

| Hypotheses          | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics ((O/STDEV)) | P values |
|---------------------|---------------------|-----------------|----------------------------|--------------------------|----------|
| H7: CDICR → CIP     | 0.042               | 0.048           | 0.073                      | 0.576                    | 0.565    |
| H8: DIL × CVR → CIP | 0.032               | 0.035           | 0.038                      | 0.847                    | 0.397    |

### 4.3.2 Mediation Analysis

Mediation analysis in Table 8 highlights the central role of CVR in translating technological and creative inputs into innovation performance. DET exhibits a complementary partial mediation effect (H9: indirect  $\beta = 0.096$ ,  $t = 2.314$ ,  $p = 0.021$ ), indicating that digital enablement technology enhances CIP both directly and indirectly through cultural value remodeling. This confirms that the benefits of technological interventions are twofold: they preserve artifacts while simultaneously facilitating creative and innovative utilization.

DIC demonstrates full mediation through CVR (H10: indirect  $\beta = 0.062$ ,  $t = 2.018$ ,  $p = 0.044$ ), confirming that digital interpretation strategies are effective only when they first transform the perceived cultural value of relics. This finding aligns with the Cultural Value Chain Theory, which posits that the conversion of cultural assets into perceivable value is essential for achieving innovation outcomes (Kanchanathaveekul et al., 2024).

CDICR also exhibits full mediation through CVR (H11: indirect  $\beta = 0.215$ ,  $t = 3.408$ ,  $p = 0.001$ ), confirming that creative design integration requires value remodeling mechanisms to produce measurable innovation performance. This result emphasizes that in Beijing's museum context, the strategic integration of technological and creative initiatives with value remodeling is critical for success.

**Table 8: Mediation Effects**

| Hypothesis             | Indirect Effect | SE    | T statistics | P values | 95% CI (Lower) | 95% CI (Upper) | Mediation Type        |
|------------------------|-----------------|-------|--------------|----------|----------------|----------------|-----------------------|
| H9: DET → CVR → CIP    | 0.096           | 0.042 | 2.314        | 0.021    | 0.031          | 0.187          | Complementary Partial |
| H10: DIC → CVR → CIP   | 0.062           | 0.031 | 2.018        | 0.044    | 0.015          | 0.138          | Full Mediation        |
| H11: CDICR → CVR → CIP | 0.215           | 0.063 | 3.408        | 0.001    | 0.112          | 0.356          | Full Mediation        |

These findings contribute to the literature on cultural innovation in heritage institutions by empirically demonstrating the mediating role of cultural value remodeling. The study provides evidence that DET, DIC, and CDICR must be strategically applied through value remodeling mechanisms to achieve significant innovation outcomes. The complementary partial mediation of DET indicates that technological practices contribute to innovation both directly and indirectly, while the full mediation of DIC and CDICR demonstrates that interpretation and design integration are effective primarily through value remodeling.

The complementary partial mediation of DET aligns with Ye (2024), who emphasized that technological interventions in heritage management yield both direct and mediated contributions to innovation. Similarly, the full mediation of DIC and CDICR supports Al-Tarawneh (2025), confirming that cultural value remodeling is critical for translating interpretation and creative practices into innovation performance. The non-significant moderation effect suggests that merely increasing the level of digital infrastructure is insufficient to strengthen the relationship between CVR and CIP. Instead, innovation performance is contingent upon the effective coordination and integration of technological, interpretive, and creative interventions.

### 5.0 Conclusion

This study examined the effects of digital enablement technology (DET), digital interpretation capacity (DIC), and creative design integration of cultural relics (CDICR) on cultural innovation performance (CIP), with cultural value remodeling (CVR) as a mediating mechanism and digital infrastructure level (DIL) as a moderating factor, focusing on museum professionals in Beijing. The findings indicate that DET, DIC, and CDICR significantly enhance CIP through CVR, with DET exhibiting complementary partial mediation and both DIC and CDICR demonstrating full mediation, whereas the moderation effect of DIL was non-significant.

Theoretically, the study extends the Cultural Value Chain framework by empirically validating the mediating role of cultural value remodeling in translating technological, interpretive, and creative practices into innovation outcomes. The findings demonstrate that digital interpretation and creative design integration require systematic value remodeling to generate measurable innovation performance, while digital enablement technologies contribute both directly and indirectly to innovation.

Practically, the results highlight the importance for museum administrators to strategically integrate technological preservation, digital interpretation, and creative design within value-enhancing frameworks to maximize innovation performance. The non-significant moderation effect suggests that investments in digital infrastructure alone are insufficient; rather, institutions must focus on how these technologies are applied to remodel cultural meaning and value.

Limitations include the focus on a single city and a professional sample, which may constrain generalizability. Future research could examine broader geographic contexts, additional cultural institutions, and longitudinal designs to explore dynamic effects of technological and creative



interventions on innovation. Comparative studies across different museum types and regions would further enrich understanding of how contextual factors shape the relationships identified in this study.

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