Research Article

From Public-Private Domain Linkage to Digital IP Asset Accumulation

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***Abstract*:** The rapid evolution of digital commerce has compelled contemporary enterprises to reconsider fragmented promotional tactics in favor of cohesive, enterprise-wide marketing informatization architectures. This paper examines the structural design and operational mechanisms of a top-level brand marketing informatization framework that bridges public-domain customer acquisition with private-domain retention, ultimately culminating in the systematic accumulation of digital intellectual property assets. By synthesizing insights across enterprise information architecture, direct-to-consumer content conversion, platform ecosystem governance, and digital asset archiving, the study explores how cross-channel data synchronization and algorithmic content routing may mitigate customer acquisition volatility while fostering long-term brand equity. Rather than positing a deterministic universal blueprint, the analysis highlights architectural trade-offs, data governance bottlenecks, and organizational friction points encountered during real-world digital transformation, suggesting that sustainable IP assetization depends on balancing agile algorithmic responsiveness with rigorous institutional standardization and compliance.

Keywords: *Brand Marketing Informatization, Top-Level Architecture, Public-Private Domain Linkage, Digital IP Assets, Enterprise Data Governance.*

1. Introduction

The contemporary commercial landscape is undergoing a profound structural realignment driven by the saturation of traditional traffic channels, rising customer acquisition costs, and the fragmentation of consumer attention across heterogeneous digital touchpoints. Historically, enterprise marketing systems evolved through piecemeal technological adoption—deploying standalone customer relationship management (CRM) databases, isolated social media management tools, and disconnected e-commerce storefronts—which inevitably engendered severe data silos and operational redundancies. Early inquiries into the digital transformation of the cultural and creative sectors highlighted both the transformative potential of digital media and the structural vulnerabilities enterprises face when legacy organizational workflows fail to synchronize with rapidly shifting digital consumption paradigms [8]. As computational capabilities matured, the integration of artificial intelligence into cultural and brand production further accelerated content generation velocity, yet simultaneously exposed critical challenges regarding algorithmic homogenization, copyright ambiguity, and governance deficits [11].

In response to these systemic pressures, the construction of a unified top-level architecture for brand marketing informatization has emerged as a central strategic priority for modern enterprises. Rather than treating marketing technology as a mere tactical toolkit for campaign execution, top-level architectural design seeks to establish an overarching digital nervous system capable of coordinating data flows, business logic, and consumer interactions across the entire brand lifecycle. Seminal architectural research on enterprise brand marketing informatization has demonstrated that fragmented IT deployments often fail to deliver sustainable competitive advantages unless anchored by a coherent top-level framework that aligns technical infrastructure with long-term brand strategy [5]. Furthermore, the establishment of standardized architectural protocols across diverse vertical industries requires a multi-dimensional evaluation framework capable of accommodating varying levels of digital maturity without sacrificing interoperability [12].

Despite growing scholarly and managerial consensus on the necessity of architectural integration, significant theoretical and practical ambiguities remain regarding how enterprises transition from ephemeral traffic harvesting to durable asset accumulation. Specifically, the operational linkage between public-domain traffic ecosystems (such as short-video platforms and open social networks) and private-domain retention environments (such as proprietary brand communities, mobile applications, and membership ecosystems) often suffers from friction in identity resolution, attribution modeling, and value transfer. Moreover, while brands generate vast volumes of visual, narrative, and interactive artifacts during these campaigns, few organizations possess the institutional mechanisms required to systematically capture, classify, and valorize these outputs as proprietary digital intellectual property (IP) assets. Considering the above factors, this study investigates how a top-level informatization architecture can structurally unify public-private domain linkage with digital IP asset accumulation, while critically examining the organizational constraints, compliance risks, and methodological limitations inherent in such complex transformations.

2. Methodological Framework and Multi-Disciplinary Architectural Synthesis

To construct a rigorous analytical foundation for the proposed top-level architecture, this study adopts a multi-disciplinary architectural synthesis approach, combining structural systems analysis with critical literature evaluation across information systems, digital marketing, platform governance, and financial risk control. During the initial phase of our investigation, we attempted to model the informatization pipeline as a strictly linear progression from public-domain exposure to private-domain conversion and subsequent asset archiving. However, preliminary examination of empirical enterprise deployments revealed that real-world marketing ecosystems rarely operate in such an idealized, sequential manner; instead, they exhibit recursive feedback loops, asynchronous data latency, and frequent misalignment between front-end creative teams and back-end IT infrastructure. Consequently, our research methodology was adjusted to incorporate non-linear architectural decoupling, focusing on how modular middleware, standardized data protocols, and governance guardrails mediate tensions across disparate operational layers.

A critical pillar of our architectural design involves evaluating how technical infrastructure interacts with user-facing inclusivity and regulatory compliance, as an architecture that neglects universal accessibility risks systemic exclusion and legal liability. Pioneering methodological work on automated web accessibility auditing utilizing static analysis and Document Object Model (DOM) rule engines provides an instructive blueprint for embedding compliance verification directly into the continuous integration pipelines of brand digital touchpoints, although such automated rule engines still face limitations in

capturing nuanced semantic context [1]. Beyond technical auditing, the successful execution of inclusive digital interfaces is heavily constrained by institutional human capital; empirical investigations into digital accessibility talent gaps under extended regulatory mandates underscore how shortages in specialized engineering expertise can bottleneck front-end deployment [15]. To address demographic inclusivity across aging and disabled consumer segments, the development of large-scale digital accessibility evaluation indicator systems offers rigorous psychometric and technical metrics for auditing brand interfaces, even though operationalizing these multi-tier indicators across high-frequency commercial campaigns remains computationally demanding [16].

Simultaneously, the back-end resilience of a marketing informatization system depends on rigorous financial governance and industrial ecosystem integration, areas frequently overlooked in purely marketing-centric literature. Insights drawn from capital efficiency evaluations in large-scale infrastructure projects, grounded in project financial-cost governance theory, offer valuable methodological analogies for evaluating return on investment (ROI) and capital allocation across long-cycle IT infrastructure deployments, albeit requiring adaptation to account for the higher intangibility of brand assets [22]. Similarly, methodologies that integrate engineering project management with certified public accounting (CPA) practices to mitigate financial vulnerabilities demonstrate how strict internal controls and audit trails can prevent budget overruns and resource misallocation during complex system rollouts [21]. At the macro-ecosystem level, architectural scalability for small and medium-sized enterprises (SMEs) cannot rely solely on heavy proprietary investments; research examining lightweight pathways to digital branding for SMEs highlights the efficacy of modular, cloud-native architectures that lower initial capital barriers while preserving strategic agility [9]. Furthermore, analyses of how industrial service ecosystems empower private enterprises through platform strategy and capital operation illustrate how external ecosystem synergies can augment internal architectural capabilities [7], while studies on the operational efficiency of enterprise service platforms provide robust empirical frameworks for benchmarking platform performance across multi-tenant environments [14].

3. Public-Private Domain Linkage and Algorithmic Conversion

The operational core of the proposed top-level architecture resides in its capacity to orchestrate seamless bi-directional flows between public-domain traffic acquisition and private-domain user retention. Unlike legacy funnel models that treat customer acquisition and retention as isolated departmental mandates, public-private domain linkage requires a unified Customer Data Platform (CDP) and marketing automation layer capable of tracking cross-platform behavioral signals in real time. Foundational research into B2B marketing automation evaluation and dynamic optimization demonstrates how algorithmic scoring and automated workflow triggers can systematically nurture leads across prolonged decision cycles, though such deterministic automation rules often require extensive recalibration when applied to impulsive, high-velocity consumer markets [4]. In the consumer sphere, authoritative investigations into the digital operation mechanisms of brand marketing under public-private domain linkage reveal that sustainable conversion depends on synchronizing public algorithmic recommendation engines with private community touchpoints through unified user identity graphs and incentive structures [10].

Within the public-domain acquisition layer, content narratives and media affordances serve as the primary catalysts for capturing consumer attention and initiating mental model alignment. Rigorous empirical research on short-video content narratives in direct-to-consumer (DTC) health brands illustrates how structured storytelling schemas reshape consumer cognitive frameworks and trust perceptions, though the

study also acknowledges the difficulty of isolating narrative effects from platform-level algorithmic amplification biases [2]. Extending this inquiry into interactive commerce environments, analyses of live-streaming e-commerce and social media content marketing from the perspective of media affordances and multi-stage conversion chains demonstrate how real-time synchronous interaction compresses the traditional awareness-to-purchase journey [13]. Furthermore, the orchestration of Key Opinion Leader (KOL) influencer matrices introduces distributed amplification nodes into the public domain; analytical frameworks examining the empowering path of KOL matrices for brand user conversion highlight the importance of tiered influencer portfolio allocation, while noting potential diminishing returns and audience fatigue when matrix messaging lacks coherent thematic governance [17].

As traffic transitions from public platforms into private brand ecosystems, the informatization architecture must support closed-loop behavioral tracking and continuous algorithmic refinement. Research tracing the evolution of the "content-seeding-conversion" closed-loop model in the short-video and live-streaming era provides compelling evidence that iterative data feedback between seeding content and conversion outcomes enables rapid creative optimization, yet also warns of over-fitting brand identity to transient algorithmic trends [18]. In cross-border operational contexts, mixed empirical studies examining the optimization of live-streaming e-commerce and KOL collaboration within cross-border DTC health models underscore how cultural localization, cross-border logistics synchronization, and localized payment gateways introduce substantial architectural complexity that domestic-only models fail to capture [20]. Together, these studies suggest that while public-private domain linkage substantially enhances conversion efficiency, its long-term stability hinges on the enterprise's ability to abstract durable brand knowledge and digital assets out of ephemeral campaign interactions.

4. Digital IP Asset Accumulation, Semantic Governance, and Ecosystem Security

The ultimate strategic objective of elevating brand marketing informatization to a top-level architectural concern is to transform transient marketing expenditures into cumulative, defensible digital intellectual property (IP) assets. As brands execute thousands of micro-campaigns across short-video, live-streaming, and private community channels, they generate an immense corpus of visual motifs, narrative scripts, virtual avatars, user-generated co-creations, and structured behavioral datasets. Without a dedicated digital asset management (DAM) and IP archiving subsystem embedded within the top-level architecture, these creative outputs rapidly degrade into unindexed, unsearchable digital clutter, exposing the enterprise to duplicated production costs and intellectual property infringement. Insightful research into the digital archive management practices of intellectual property assets for cross-border DTC brands establishes a systematic taxonomy for cataloging, rights-clearing, and lifecycle tracking of brand creative artifacts across jurisdictions, though implementing such granular metadata tagging across high-volume content pipelines remains a formidable operational hurdle [3]. Complementing this operational view, legal-economic analyses of the digital construction, operation, and maintenance of overseas intellectual property archives for consumer brands emphasize how structured digital provenance records serve as critical evidentiary assets in international trademark and copyright disputes, while highlighting the ongoing maintenance costs required to keep cross-border registries synchronized with evolving local regulations [19].

To ensure that accumulated digital IP assets remain both discoverable and protected against unauthorized appropriation across open networks, the top-level architecture must incorporate advanced semantic processing and cryptographic security layers. Methodological advancements in multi-modal steganography based on semantic relevancy offer a highly promising technical mechanism for embedding

imperceptible digital watermarks and ownership metadata directly into brand visual and audio assets without degrading perceptual quality, although further research is needed to test the robustness of semantic steganography against aggressive adversarial compression by third-party social platforms [23]. Concurrently, as enterprises deploy generative AI and large language models (LLMs) to query internal IP archives and automate brand communications, ensuring factual and brand-consistent outputs becomes paramount. Groundbreaking research on mitigating knowledge conflicts in language model-driven question answering provides critical architectural insights into resolving contradictions between parametric model memory and dynamically updated enterprise knowledge bases, a mechanism directly applicable to preventing brand hallucination and maintaining narrative consistency across automated customer touchpoints [24]. Finally, the long-term vitality of an enterprise's digital IP repository is inextricably linked to external knowledge inflows; research on the operation mechanisms and achievement transformation efficiency of industry-university-research collaborative innovation platforms illustrates how structured institutional partnerships can continuously inject cutting-edge computational and creative methodologies into enterprise architectures, provided that clear intellectual property attribution agreements are established upfront [6].

5. Bridging Architectural Synthesis to Practical Implementation and Future Trajectories

Looking across the structural interplay between public-private domain linkage, multi-modal content conversion, and digital IP assetization, it becomes evident that brand marketing informatization is neither a purely technical engineering challenge nor a simple exercise in promotional optimization, but rather an ongoing socio-technical negotiation between algorithmic agility and institutional governance. While the architectural synthesis articulated in the preceding sections outlines a coherent pathway for capturing ephemeral traffic flows and crystallizing them into durable, legally defensible intellectual property repositories, the practical realization of such systems remains contingent upon organizational adaptability, cross-departmental data literacy, and evolving regulatory landscapes surrounding data privacy and generative AI copyright. Future empirical inquiries would benefit from longitudinal, multi-industry case studies that rigorously measure the trade-offs between centralized architectural standardization and localized creative autonomy, as well as the development of standardized valuation metrics capable of formally recognizing accumulated digital IP assets on corporate balance sheets.

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Conflicts of Interest
The author(s) declare no conflicts of interest.

Ethical Approval and Consent to Participate
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References

[1] *Liu, X. (2026). Research on Government Web Accessibility Automated Auditing Technology Based on Static Analysis and DOM Rule Engine. Innovation in Science and Technology, 5(3), 40-48.*

[2] *Jin, M. (2026). Research on the Path of Short-Video Content Narratives Shaping User Mental Models for DTC Health-Consumption Brands. Journal of Linguistics and Communication Studies, 5(3), 16-24.*

[3] *Huang, J. (2026). Research on Digital Archive Management Practice of Intellectual Property Assets for Cross-Border DTC Brands. Frontiers in Management Science, 5(3), 61-70.*

[4] *Lu, B. (2025). B2B Marketing Automation: Evaluation and Dynamic Optimization. Journal of World Economy, 4(4), 107-113.*

[5] *Ma, H. (2026). Research on the Current Status and Top-Level Architecture Design of Enterprise Brand Marketing Informatization Construction. Journal of World Economy, 5(3), 64-74.*

[6] *Shi, C. (2026). Research on the Operation Mechanism and Achievement Transformation Efficiency of Industry-University-Research Collaborative Innovation Platform. Journal of World Economy, 5(2), 40-48.*

[7] *Chuan, S. (2026). Platform Strategy, Capital Operation and Industrial Resource Integration: Multi-Dimensional Transmission Mechanism of Private Economy Empowered by Industrial Service Ecosystem. Insights in Social Science, 4(3), 12-22.*

[8] *Zhan, X. (2024). Digital transformation of the cultural industry: Challenges and opportunities. Frontiers in Management Science, 3(6), 29-35.*

[9] *Lu, B. (2025). The Lightweight Path to Digital Branding for SMEs. Frontiers in Management Science, 4(5), 29-34.*

[10] *Ma, H. (2026). Research on Digital Operation Mechanism of Brand Marketing Under Public-Private Domain Linkage. Frontiers in Management Science, 5(4), 1-9.*

[11] *Zhan, X. (2025). Artificial intelligence in the cultural industry: Applications and challenges. Innovation in Science and Technology, 4(1), 62-68.*

[12] *Lu, B. (2025). The Three-Dimensional Standard Framework and Industry Adaptation in Brand Marketing Informatization. Studies in Social Science & Humanities, 4(5), 9-14.*

[13] *Jin, M. (2026). Research on the Implementation Mechanism of Live-Streaming E-Commerce and Social Media Content Marketing for DTC Brands—From the Perspective of Media Affordances and Multi-Stage Conversion Chain. Frontiers in Management Science, 5(4), 39-48.*

[14] *Shi, C. (2026). Research on Digital Operation System and Efficiency Evaluation of Enterprise Service Platform. Frontiers in Management Science, 5(3), 26-33.*

[15] *Liu, X. (2026). Analysis of the Causes of Digital Accessibility Talent Gaps for Public Entities Under the Background of ADA Compliance Extension. Law and Economy, 5(3), 106-114.*

[16] *Xincheng, L. (2026). Construction of Large-Scale Digital Accessibility Evaluation Indicator System for the Elderly and People with Disabilities. Journal of Academic Research and Advances, 2(2), 51-60.*

[17] *Jin, M. (2026). An Analysis on the Empowering Path of KOL Influencer Matrix Marketing for Brand User Conversion. Journal of World Economy, 5(3), 33-43.*

[18] *Meiying, J. (2026). Research on the Evolution of the "Content-Seeding-Conversion" Closed-Loop Model for DTC Brands in the Short-Video and Live-Streaming Era. Research in Media and Communication, 2(2), 76-86.*

[19] *Huang, J. (2026). Research on Digital Construction, Operation and Maintenance of Overseas Intellectual Property Archives for Consumer Brands. Law and Economy, 5(3), 89-97.*

[20] *Jin, M. (2026). Application and Optimization Path of Live Streaming E-Commerce and KOL Collaboration in the DTC Model: A Mixed Empirical Study Based on Cross-Border DTC of Health Consumer Products. Journal of Research in Social Science and Humanities, 5(3), 42-51.*

[21] *Chen, P. (2026). Controlling Financial Vulnerabilities in Infrastructure Projects by Integrating Engineering Management and CPA Practices. Law and Economy, 5(3), 98-105.*

[22] *Chen, P. (2026). Evaluation of Capital Efficiency of Public-Infrastructure Projects Based on Project Financial-Cost Governance Theory. Journal of World Economy, 5(3), 44-52.*

[23] *Hu, Y., Yang, Z., Cao, H., & Huang, Y. (2020, November). Multi-modal steganography based on semantic relevancy. In International Workshop on Digital Watermarking (pp. 3-14). Cham: Springer International Publishing.*

[24] *Cao, H., Zhang, Z., Li, X., Wu, C., Zhang, H., & Zhang, W. (2024, December). Mitigating knowledge conflicts in language model-driven question answering. In 2024 6th International Academic Exchange Conference on Science and Technology Innovation (IAECST) (pp. 449-454). IEEE.*