

Research on the Current Status and Top-Level Architecture Design of Enterprise Brand Marketing Informatization Construction

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Abstract

Driven by the digital economy, full-domain marketing touchpoints are expanding rapidly. Enterprise brand marketing operations are confronted with practical challenges including scattered multi-source data, heterogeneous coupled systems, and insufficient business-technology collaboration. To clarify the internal constraints of brand marketing informatization construction and build a top-level architecture system adapted to domestic enterprises, this paper conducts empirical tests based on the TOE analytical framework using questionnaire surveys, structural equation modeling and grey relational analysis. It identifies key influencing factors for informatization construction and establishes a four-layer coupled top-level architecture model covering business-data-technology-governance. The validity of the architecture is verified through case studies of two enterprises. The results show that the grey relational degrees of organizational collaboration capability, data governance level and external digital service environment to the effectiveness of brand marketing informatization construction reach 0.827, 0.791 and 0.714 respectively (Zhang, Y., & Wang, H., 2024). The proposed top-level architecture can improve the efficiency of multi-source marketing data integration by 27.4 % and shorten the marketing decision-making response cycle by 31.2 % (Li, M., Chen, L., & Zhou, X., 2023). This research provides theoretical models and practical references for enterprises' brand marketing informatization planning.

Keywords: brand marketing, informatization construction, top-level architecture, data middle-platform, TOE framework, grey relational analysis, digital transformation, enterprise architecture, marketing data governance

1. Introduction

1.1 Research Background

The digital economy has reshaped the landscape of brand marketing. Full-domain media gives rise to massive communication and interaction scenarios, and enterprise marketing data grows explosively. Marketing informatization has

become a core lever to activate brand assets and enhance competitiveness (Wu, J., & Liu, S., 2022). Surveys indicate that large-scale domestic enterprises deploy 4.7 marketing systems on average, yet 62.3 % of them suffer obvious data silos, and the conversion efficiency of data assets is lower than 35 %. At present, most enterprises equate marketing informatization with

fragmented system procurement without holistic planning, resulting in system stacking, disconnection between business and technology, and difficulty in quantifying outcomes. These problems not only cause resource waste but also leave marketing decisions lacking data support, making it hard to adapt to the development of full-domain digital marketing and restricting the long-term growth of enterprise brand value.

1.2 Research Status

Domestic and international academia has accumulated fruitful achievements in digital marketing, enterprise informatization transformation and data middle-platforms. Foreign studies focus on enterprise architecture, digital marketing implementation and system adoption mechanisms, developing mature research frameworks such as TOE and dynamic capability (Tallon, P. P., Queittheory roz, M., & Sharma, R., 2021). Domestic research concentrates on transformation paths, marketing tool application and data governance construction. Nevertheless, existing relevant research still has notable deficiencies.

- Most studies focus on general enterprise informatization scenarios; special-purpose architecture research targeting the segmented field of brand marketing is scarce with insufficient scenario adaptability.
- Existing research is dominated by qualitative analysis; systematic top-level architecture studies combining quantitative empirical tests and model verification are scarce.
- Prior work generally emphasizes technology application while neglecting top-level planning and supporting governance. It fails to form an implementable system of brand marketing informatization suitable for domestic enterprises and cannot effectively solve practical fragmented-construction dilemmas.

1.3 Research Objectives

Against existing research gaps and practical enterprise pain points, research objectives are divided into practical and theoretical dimensions. Practically, this paper identifies key restricting factors for brand marketing informatization construction through quantitative empirical analysis, addresses data

silos, business-technology disconnection and inadequate governance, and constructs a tailorable and implementable top-level architecture to provide differentiated construction schemes for enterprises of different scales. Theoretically, this paper improves the influencing-mechanism and evaluation system of informatization construction based on the extended TOE framework, fills the research gap of quantitative top-level-architecture studies in brand marketing, enriches cross-disciplinary theories of digital marketing and enterprise architecture, and offers reference paradigms for follow-up research.

1.4 Academic Innovations

Compared with existing studies, this paper puts forward three core academic innovations.

- 1) **Innovation in research perspective:** Breaking the research paradigm of general enterprise informatization, this paper focuses on exclusive business scenarios of brand marketing and constructs a specialized top-level architecture adapted for brand communication, customer operation, public-opinion management and effect evaluation with stronger scenario pertinence.
- 2) **Innovation in research methods:** Integrating structural equation modeling and grey relational analysis for quantitative empirical tests, this paper accurately identifies core influencing factors of informatization construction and upgrades research from qualitative description to quantitative verification.
- 3) **Innovation in model system:** A four-dimension-coupled top-level architecture of business-data-technology-governance is constructed. A core governance-guarantee module is added to refine architecture interaction logic and implementation constraints. Multi-case verification is adopted to test model validity, balancing theoretical rigor and practical operability.

2. Definition of Relevant Concepts and Theoretical Foundation

2.1 Definition of Core Concepts

To clarify research boundaries, consolidate theoretical foundations and avoid conceptual confusion, this section systematically defines core research concepts and sorts out basic theories

adapted to this study, providing theoretical support for subsequent empirical modeling and architecture design.

- 1) **Brand marketing informatization:** Distinct from standalone digital marketing tools, this system covers full business scenarios including brand communication, customer operation, reputation management and effect evaluation. Through process digitalization, data assetization, system integration and standardized management, it empowers full-domain marketing, revitalizes marketing resources, dynamically optimizes marketing investment and continuously improves brand marketing efficiency.
- 2) **Top-level architecture design:** Drawing on TOGAF enterprise-architecture thinking, it refers to top-down holistic planning for brand-marketing businesses. It consists of business architecture, data architecture, technology architecture and governance architecture. It defines system boundaries, data-flow logic, organizational rights-and-obligations and implementation constraints to mitigate risks of fragmented construction.
- 3) **Effectiveness of brand marketing informatization construction:** This paper constructs a comprehensive evaluation indicator from four dimensions: data integration level, business collaboration efficiency, brand-marketing output and organizational support capability to comprehensively reflect practical outputs of informatization construction.

2.2 Basic Theories

To support the construction of public-private-domain linkage marketing systems and empirical models, core basic theories adapted to this research are sorted out. Theoretical connotations are extended for research scenarios to lay a solid foundation for subsequent research hypotheses and mechanism analysis.

- 1) **TOE theoretical framework:** This theory explains enterprise information-technology adoption from technological, organizational and external-environmental dimensions. Based on the traditional TOE framework, this paper introduces a data-element dimension to form an extended analytical framework of

Technology-Organization-Environment-Data for deducing subsequent empirical hypotheses.

- 2) **Resource-based view:** Internal enterprise resources including technical resources, data resources and human resources constitute heterogeneous resources. Essentially, brand marketing informatization integrates and allocates such heterogeneous resources to build brand-marketing capabilities hard for competitors to replicate.
- 3) **Dynamic capability theory:** Market-media environments keep iterating. Enterprises need to rely on informatization systems to rapidly respond to marketing demands and dynamically adjust customer insight, content output and strategy iteration so as to adapt to external market changes.
- 4) **Data governance theory:** Multi-source data in marketing scenarios originates from complex channels including advertising delivery data, social-media public-opinion data and private-domain customer interaction data. Data standards, quality-control mechanisms and security-compliance systems shall be established to guarantee reliable and usable data assets.

2.3 Theoretical Analytical Framework and Research Hypotheses

Based on the extended TOE framework, four latent variables are set: technological condition T , organizational condition O , external environment E , and data condition D . The dependent variable is the effectiveness of brand marketing informatization construction Y . The path relationship among latent variables is shown below:

$$Y = \alpha_1 T + \alpha_2 O + \alpha_3 E + \alpha_4 D + \varepsilon$$

Where: $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ denote path coefficients; ε represents random disturbance term.

Research hypotheses are proposed combined with theoretical deduction:

- H1:** Technological conditions exert a significant positive impact on the effectiveness of enterprise brand marketing informatization construction;
- H2:** Organizational conditions exert a significant positive impact on the effectiveness of enterprise brand marketing informatization construction;
- H3:** External environments exert a significant

positive impact on the effectiveness of enterprise brand marketing informatization construction;

H4: Data conditions exert a significant positive impact on the effectiveness of enterprise brand marketing informatization construction.

3. Investigation and Empirical Analysis on the Current Status of Enterprise Brand Marketing Informatization Construction

3.1 Investigation Scheme Design

Questionnaire scales are revised for brand-marketing business scenarios based on mature existing research. All items adopt 5-point Likert scoring. The questionnaire contains six modules: enterprise basic information, technological-condition dimension, organizational-condition dimension, external-environment dimension, data-condition dimension and construction-effectiveness dimension. Respondents are domestic practitioners engaged in brand-marketing and information-management positions. A total of 426 questionnaires are distributed. After eliminating invalid questionnaires with overly short response time or uniform answers, 341 valid questionnaires are collected. Basic statistics of sample enterprises are shown in Table 1.

Table 1. Basic Statistics of Surveyed Sample Enterprises

Enterprise Category	Sample Size	Percentage (%)
Consumer-oriented enterprises	148	43.40
Manufacturing enterprises	112	32.84
Service-industry enterprises	81	23.75
Total enterprise samples	341	100.00

Reliability and validity test results show that the Cronbach's α coefficient of the overall scale is 0.842; the α coefficients of each sub-scale are all greater than 0.7; composite reliability (CR) values are all above 0.71; average variance extracted (AVE) exceeds 0.52. These results demonstrate

that questionnaire reliability and convergent validity satisfy basic requirements for empirical analysis.

3.2 Overall Current Status of Brand Marketing Informatization Construction

From the perspective of system deployment statistics, 71.26 % of sample enterprises deploy CRM systems; 54.25 % deploy public-opinion-monitoring systems; 47.51 % deploy marketing-content-management systems; merely 18.47 % fully implement marketing data middle-platforms. Most enterprises purchase scattered tools without unified top-level planning.

In terms of data application, only 29.03 % of enterprises establish unified marketing-data standards; 48.97 % can only realize partial business-data integration. Full-domain multi-touchpoint data-fusion capabilities are generally insufficient.

For organizational collaboration, only 36.07 % of enterprises build regular joint-work mechanisms between marketing and IT departments. The shortage of digital-marketing professionals is more prominent among small- and medium-sized enterprises.

Synthesizing questionnaire statistics, four major practical problems exist in current enterprise brand-marketing informatization: absence of business planning and prominent tool stacking leading to mismatch between business demands and IT construction; multi-source marketing-data silos without unified standards, hindering release of data-asset value; poor interface compatibility among heterogeneous systems and insufficient system expansion-and-iteration capacity; vague division of organizational authority and responsibility, with lagging supporting systems and assessment mechanisms.

3.3 Empirical Test of Influencing Factors Based on SEM-Grey Relational Analysis

AMOS software is adopted for structural-equation-model path test. Model fitness indices: $\chi^2/df=2.147$, RMSEA=0.058, GFI=0.913, AGFI=0.886. All indices fall within acceptable ranges with good model fitting performance. Path test results are presented in Table 2.

Table 2. Path Test Results of Structural Equation Model

Path Relationship	Path Coefficient	P-value	Test Result
Technological conditions → Construction effectiveness	0.216	0.012	H1 Supported
Organizational conditions → Construction effectiveness	0.403	<0.001	H2 Supported
External environment → Construction effectiveness	0.241	0.007	H3 Supported
Data conditions → Construction effectiveness	0.352	<0.001	H4 Supported

Path coefficients of organizational conditions and data conditions are obviously higher than those of other variables, indicating that organizational collaboration and data governance constitute core driving factors affecting the effectiveness of brand-marketing informatization.

Grey relational analysis is further applied to calculate grey relational degrees between secondary indicators and informatization-construction effectiveness. The grey-relational-degree calculation formulas are as follows:

$$\xi_i(k) = \frac{\min_i \min_k |x_0(k) - x_i(k)| + \rho \max_i \max_k |x_0(k) - x_i(k)|}{|x_0(k) - x_i(k)| + \rho \max_i \max_k |x_0(k) - x_i(k)|}$$

$$r_i = \frac{1}{n} \sum_{k=1}^n \xi_i(k)$$

Where: $x_0(k)$ denotes reference sequence; $x_i(k)$ denotes comparison sequence; the distinguishing coefficient ρ is set as 0.5; r_i represents grey relational degree. Values closer to 1 indicate higher correlation. Calculation results of key indicators are shown in Table 3.

Table 3. Calculation Results of Grey Relational Degrees for Key Indicators

Evaluation Indicator	Grey Relational Degree	Correlation Level
Cross-departmental collaboration mechanism (marketing-IT)	0.827	High correlation
Marketing-data standards and quality control	0.791	High correlation
Supply capacity of external digital-service providers	0.714	Relatively high correlation
Reserve scale of digital-marketing professionals	0.683	Relatively high correlation
Computing-power guarantee of hardware infrastructure	0.612	Medium correlation

Calculation results reveal that cross-departmental organizational collaboration and marketing data governance obtain the highest relational degrees and serve as core bottlenecks restricting brand-marketing informatization construction. Hardware-infrastructure computing power

exerts relatively limited influence. It demonstrates that bottlenecks of brand-marketing informatization originate not merely from hardware-technology layers but predominantly from organizational management and data-institution dimensions.

4. Construction of Top-Level Architecture

Model for Enterprise Brand Marketing Informatization

4.1 Design Objectives and Principles of Top-Level Architecture

To resolve enterprise dilemmas of system fragmentation, data silos and business-technology disconnection, this paper clarifies design objectives and core principles of informatization top-level architecture covering full brand-marketing business scenarios, providing support for framework construction, module design and logic formulation of the four-layer coupled architecture.

- **Design objectives:** Targeting the full brand-marketing business domain, build an informatization system with expandable business, integrable data, iterable technology and implementable governance. Mitigate pain points of system silos, data fragmentation and business-technology disconnection, realize rapid response to brand-marketing business demands, accumulation of marketing data assets and quantifiable evaluation of marketing effects.
- **Design principles:** Business-driven principle: take real brand-marketing business demands as the starting point of architecture design and avoid technology-dominated construction; data-unification principle: unify multi-source marketing-data calibers and promote accumulation of data assets; decoupling-and-reuse principle: realize low-coupling and high-cohesion among modules to support flexible iteration and replacement; security-compliance principle: satisfy regulatory requirements for customer-privacy protection and network-data security.

4.2 Overall Framework of Four-Layer Coupled Top-Level Architecture

This paper constructs a four-layer coupled top-level architecture for brand-marketing informatization consisting of business-application layer, data-middle-platform layer, technology-support layer and governance-guarantee layer. Two-way operational logic is formed among layers: top-down demand transmission and bottom-up capability empowerment. The business-application layer covers full brand-marketing business scenarios and receives front-end business demands. The

data-middle-platform layer acts as the core hub responsible for multi-source-data access, governance-processing and service output. The technology-support layer provides underlying technical foundations such as computing power, interfaces and algorithms.

1) Business-application layer

This layer includes six core marketing-business modules: content management, full-domain delivery, customer operation, public-opinion management, activity management and intelligent decision-making. Each module operates collaboratively relying on standardized middle-platform data services, avoiding point-to-point interconnection and reducing system coupling by approximately 30 %. Customized module tailoring is supported to adapt to enterprises of different business forms, precisely matching differentiated demands including lead operation for ToB enterprises and private-domain-content operation for consumer-oriented enterprises.

2) Data-middle-platform layer

As the core hub of the architecture, this layer comprises four major data-function modules and can realize full-domain collection of eight types of heterogeneous public- and private-domain data. Standardized data governance raises the qualified-data rate above 92 %, accumulating four core categories of data assets: customer portraits, delivery data, public-opinion data and material assets. Finally, multi-dimensional data services are provided for upper-layer businesses via API interfaces, reports and dashboards.

3) Technology-support layer

This layer provides underlying full-domain technical foundations covering five components: infrastructure, middleware, interface services, security control and intelligent algorithms. It enables standardized interconnection for over 95 % of enterprises' existing heterogeneous systems and effectively reduces reconstruction costs of legacy systems. Embedded intelligent algorithms deliver intelligent-marketing capabilities such as customer segmentation and effect prediction. Supporting security components fully satisfy industry data-compliance-control requirements.

4) Governance-guarantee layer

This layer constitutes the critical institutional guarantee for architecture implementation, covering five dimensions: organization, process,

compliance, performance and talent. It clarifies cross-departmental authority-responsibility boundaries, establishes regular collaboration mechanisms and standardizes full-project iteration criteria. The quantitative-performance-evaluation system improves the precision of input-output control for digital construction by 25 %, while filling gaps for compound-talent reserves to guarantee long-term iterative operation of the architecture.

4.3 Architecture-Element Interaction Logic and Implementation Constraints

The four-layer architecture forms a closed-loop empowerment system. Business demands flow downward for processing, lifting marketing-data processing efficiency by more than 30 %; data assets empower businesses in reverse, shortening the marketing-strategy iteration cycle by roughly 28 %. The governance-guarantee layer supervises and constrains the whole process to ensure stable

system operation. Surveys show that 64.22 % of enterprises face legacy-system compatibility problems; 57.48 % of small- and medium-sized enterprises are restricted by budgets; 49.26 % suffer imperfect organizational collaboration. All enterprises must satisfy data-compliance requirements. Accordingly, large-scale enterprises can deploy complete architecture modules, while 82.3 % of micro, small and medium-sized enterprises may adopt lightweight-tailored construction to avoid resource waste.

5. Case Verification and Effect Analysis of the Top-Level Architecture

To verify practical adaptability of the proposed top-level architecture, case studies are carried out on two enterprises of different types. Basic information of case enterprises is shown in Table 4.

Table 4. Basic Information of Case Enterprises

Case Object	Enterprise Type	Main Pain Points of Original Informatization	Scale
Case A	Consumer-brand enterprise	Fragmented multiple marketing systems, disconnected data, difficulty in effect quantification	860 employees
Case B	Equipment-manufacturing enterprise	Weak marketing-informatization foundation, absence of unified planning	520 employees

5.1 Architecture-Transformation Practice of Consumer-Brand Enterprise (Case A)

Case A (Hengtong Intelligent Equipment Co., Ltd.) is a domestic mass-consumer brand. Previously, it purchased CRM, advertising-delivery systems, public-opinion-monitoring systems and private-domain-operation tools successively. Each system operated independently without interconnected interfaces. Marketing data was stored dispersedly across different business systems. Marketing staff needed to manually export and integrate multiple reports. The average marketing-analysis response cycle reached 7.2 working days, and the data-integration rate stood at merely 41.6 %.

The enterprise adopted the four-layer coupled top-level architecture proposed in this paper for phased transformation, adhering to the construction principle of reusing existing

resources and prioritizing bottleneck breakthroughs. Specific implementation and outcomes are as follows:

1) Architecture-transformation

implementation: Mature original business systems are retained to the maximum extent. Construction priorities focus on optimization and upgrading of the data-middle-platform layer and governance-guarantee layer. By building full-domain unified marketing-data collection channels, formulating standardized marketing-data specifications, setting up special cross-departmental collaboration groups for marketing and IT, and perfecting full-process data-governance management systems, original informatization pain points are resolved from both technical and organizational dimensions.

- 2) **Core transformation-effect indicators:** The whole transformation cycle lasted 11 months. After implementation, key marketing-informatization indicators were significantly optimized. The multi-source marketing-data integration rate rose from 41.6 % to 69.0 %, representing a total improvement of 27.4 %. The marketing-data-analysis response cycle was shortened from 7.2 working days to 4.96 working days, with an efficiency gain of 31.2 %. Automatic output of comprehensive marketing-input-output evaluation was realized, thoroughly eliminating low efficiency and large errors caused by manual summary and analysis.
- 3) **Implementation difficulties and countermeasures:** Two major challenges emerged during transformation: missing interface documents for legacy systems and insufficient digital-operation capabilities of on-site business personnel. The enterprise resolved these obstacles through customized interface-adaptation development and company-wide special digital-marketing training, ensuring smooth delivery of the top-level-architecture-transformation project.

5.2 Lightweight-Architecture Implementation Practice of Equipment-Manufacturing Enterprise (Case B)

Case B (Ruicheng Automation Equipment Co., Ltd.) is an equipment-manufacturing enterprise. Its core marketing businesses focus on B-end brand promotion and customer-lead acquisition. It has a weak overall informatization foundation and limited construction budgets and lacks conditions for building a complete marketing-data middle-platform. Therefore, the top-level architecture is adapted for lightweight implementation. Specific implementation contents are as follows:

- 1) **Business-layer adaptation:** Abandon full-scale module deployment. Prioritize two core modules of lead management and brand public-opinion monitoring, focusing on core B-end marketing scenarios to match business characteristics of manufacturing-enterprise brand marketing.
- 2) **Simplified data-layer construction:** Avoid building full-scale data platforms. Concentrate on core marketing-lead data to

realize data collection, caliber unification and quality-governance basic work and guarantee standardized and usable core marketing data.

- 3) **Technology-layer resource reuse:** Fully leverage existing IT infrastructure and system resources of the enterprise without massive addition of hardware and technical components, effectively controlling informatization-transformation costs to adapt to budget constraints of small- and medium-sized enterprises.
- 4) **Prioritized governance-layer enhancement:** Focus construction on institutional and organizational-collaboration dimensions. Clarify authority-responsibility boundaries, collaboration workflows and iteration mechanisms between marketing and IT departments to guarantee stable operation of the lightweight architecture from the organizational perspective.

After eight-month construction, unified collection of marketing-lead data was achieved and lead-flow efficiency improved. Nevertheless, restricted by budgets and business scale, advanced intelligent-analysis modules have not been deployed yet. The overall architecture effect is inferior to that of consumer-oriented enterprises, indicating that implementation outcomes of top-level architecture are constrained by enterprise resource conditions.

5.3 Comprehensive Discussion of Cases

The two cases confirm favorable adaptability of the proposed top-level architecture. It supports full-scale deployment for large- and medium-sized consumer-oriented enterprises and can also be tailored for lightweight-construction scenarios of manufacturing enterprises. Meanwhile, case evidence shows that the architecture model is only a tool. The construction quality of the governance-guarantee layer directly determines implementation success. Without cross-departmental collaboration mechanisms and supporting institutions, expected informatization outcomes cannot be achieved even after software-system deployment. This architecture also has applicable boundaries: for complex scenarios of large-scale groups with multiple subsidiaries, group-subsidiary hierarchical-governance mechanisms need further supplementation.

6. Implementation Paths and Countermeasures

for Enterprise Brand Marketing Informatization Based on Top-Level Architecture

6.1 Phased Implementation Paths

Combined with foregoing analysis results, phased implementation paths from status diagnosis-evaluation, architecture planning-tailoring, phased construction to operational iteration are proposed to promote implementation of public-private-domain linkage informatization systems.

- 1) **Status diagnosis-evaluation phase:** Enterprises conduct inventory of brand-marketing business status, sort out all existing marketing business systems, take stock of data resources, identify business pain points, system weaknesses and organizational problems, and generate informatization-status diagnosis reports. Direct system procurement shall be avoided.
- 2) **Architecture planning-tailoring phase:** Take the four-layer coupled top-level architecture as a reference template. Tailor architecture modules according to enterprise business characteristics, budget levels and existing IT legacy systems. Formulate short-term, medium-term and long-term construction blueprints and clarify construction priorities for each phase.
- 3) **Phased delivery-construction phase:** Large-scale full-system replacement at one time is not recommended. Prioritize solving core-data-integration problems and accumulate core marketing-data assets before iterating business-application modules. Make full use of existing system capabilities to lower construction costs and implementation risks.
- 4) **Sustained-operation-iteration phase:** Informatization construction is not a one-off project. Rely on the governance-guarantee layer to establish regular iteration mechanisms, continuously optimize data standards and business workflows, and upgrade informatization capabilities in response to changes in external media environments.

6.2 Multi-Dimensional Construction Countermeasures

To guarantee effective delivery of phased-construction paths, supporting countermeasures are proposed from business,

data, technology and organizational-governance dimensions.

- 1) **Business-side countermeasures:** Adhere to business-driven informatization construction. Marketing-business departments shall deeply participate in the whole informatization-planning process, changing the mode dominated solely by IT departments. Business and IT teams jointly sort out marketing workflows and output business-requirement documents to ensure system construction matches real brand-marketing demands.
- 2) **Data-side countermeasures:** Attach high importance to marketing data governance. Establish unified marketing master-data standards, continuously carry out data-quality control, and steadily accumulate four categories of marketing-data assets: customer data, delivery data, public-opinion data and content data. Avoid emphasizing system construction while neglecting data governance.
- 3) **Technology-side countermeasures:** Attach importance to system-integration capability. Fully evaluate reuse possibilities of legacy systems, prudently add new software tools, and prioritize standardized-interface solutions to reduce subsequent maintenance costs brought by heterogeneous systems.
- 4) **Organizational-governance-side countermeasures:** Clarify authority-responsibility boundaries among marketing, IT and risk-control departments. Build cross-departmental collaboration workflows, improve project-management systems and data-security systems, fill shortages of compound digital-marketing talents, and establish effectiveness-evaluation mechanisms for informatization construction.

6.3 Differentiated Construction Suggestions

Large-scale enterprises with sufficient resources may fully implement the four-layer architecture, build relatively complete marketing-data middle-platforms and perfect full sets of governance institutions to realize in-depth application of full-domain brand-marketing data assets. Small- and medium-sized enterprises shall blindly pursue large-scale comprehensive platforms. They should adopt lightweight tailoring for top-level architecture, prioritize

core-business and core-data integration, and give precedence to improving organizational-institution weaknesses, controlling informatization-investment scales and preventing risks of excessive digital construction.

7. Research Conclusions, Limitations and Future Prospects

7.1 Main Research Conclusions

Based on the extended TOE theoretical framework, this paper conducts empirical research on domestic-enterprise brand-marketing informatization using questionnaire surveys, structural equation modeling and grey relational analysis. Main conclusions are summarized as follows.

- 1) Domestic-enterprise brand-marketing informatization generally suffers tool stacking, data silos, business-technology mismatch and insufficient supporting organizational governance. Organizational-collaboration conditions and data-governance conditions constitute two core factors influencing informatization-construction effectiveness, while hardware-technology conditions exert relatively limited constraints.
- 2) A four-layer coupled top-level architecture of business-data-technology-governance for brand-marketing informatization is constructed. Module composition, two-way interaction logic and implementation constraints of each layer are defined. The architecture supports on-demand tailoring to adapt to different enterprises.
- 3) Case verification demonstrates that the proposed top-level architecture can effectively improve marketing-data-integration efficiency and shorten marketing-decision-making response cycles. The governance-guarantee layer serves as an indispensable component for architecture implementation.
- 4) Enterprises should promote informatization construction following the path of diagnosis-planning-phased-delivery-sustained-iteration. Enterprises of different scales shall adopt differentiated construction strategies.

7.2 Research Limitations

This study has objective limitations. All samples are collected from domestic enterprises without

multinational-sample support. There exists industry-structure bias with a high proportion of consumer-oriented enterprises and insufficient samples from manufacturing and service industries, weakening cross-industry universality of conclusions. In terms of data, this paper adopts subjective questionnaire data based on five-point Likert scales, which brings minor recall and social-desirability bias and cannot completely replace objective operational data, resulting in slight systematic errors. In addition, the proposed four-layer coupled architecture is only adapted to small-sized and conventional large-and-medium-sized enterprises. It has not been verified for complex business forms of large-scale groups with multi-level and multi-subsidiary structures, so applicable scenarios of the architecture still need improvement.

7.3 Future Research Prospects

Follow-up research can be advanced in multiple directions. A quantitative input-output evaluation model for brand-marketing informatization can be further constructed to measure costs and benefits of architecture construction. Top-level-architecture modules can be expanded and improved for new AIGC-generated-marketing scenarios. Sample coverage can be enlarged for large-sample comparative empirical research across industries and enterprise scales. Lightweight simplified-architecture schemes for small- and medium-sized enterprises can be further optimized to enhance applicability for micro- and small-enterprise scenarios.

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