

Research on Digital Operation and Management Model of Private Domain Traffic for Physical Stores

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Abstract

Against the backdrop of the digital economy, surging customer acquisition costs in the public domain, offline passenger flow loss, and difficulties in precipitating user assets have severely restricted the sustainable development of physical stores. Targeting the industrial drawbacks of fragmented, experience-driven private domain operation lacking quantitative systems in traditional brick-and-mortar stores, this study takes physical retail stores as research samples and carries out empirical research grounded in core theories including human-goods-scenario reconstruction and user lifetime value, alongside grounded theory, structural equation modeling and multi-case triangulation verification methods.

This paper extracts five core dimensions: digital empowerment, full-domain contact point precipitation, refined user operation, data governance and closed-loop performance management. It incorporates user trust and user stickiness as mediating variables, business format type and digital maturity as moderating variables, and constructs an integrated model for digital private domain operation of physical stores. Empirical results indicate that all five dimensions significantly and positively improve private domain operation performance, among which data governance ($\beta=0.423$, $p<0.001$) and refined user operation ($\beta=0.391$, $p<0.001$) exert the strongest driving effects, and both mediating and moderating mechanisms are valid.

Keywords: physical stores, private domain traffic, digital operation, human-goods-scenario reconstruction, user assetization, structural equation model, closed-loop operation, grounded theory, retail transformation

1. Introduction

Driven by the digital economy, physical retail has shifted from location dividends to user asset dividends, while the drawbacks of traditional experience-based business models have become prominent. Rising customer acquisition costs in the public domain, passenger flow loss and barriers to user asset precipitation have forced stores to accelerate digital transformation of private domains. This chapter systematically sorts out the research context and lays a theoretical foundation for subsequent model construction and empirical analysis.

1.1 Research Background

The digital economy compels physical retail to abandon the location-dividend operation model. Public-domain customer acquisition costs have cumulatively risen by 68.3% over five years, natural offline passenger flow declines by 19.7% annually, and over 70% of small and medium-sized stores struggle with poor user precipitation and low repurchase rates. Only 12.4% of chain brands have realized regular private domain operation. As of 2025, the digital penetration rate of domestic physical stores reached 62.5%, yet a clear divide exists between chain brands (85%) and independent single stores (41.2%). Currently, 83.7% of private domain research focuses on online scenarios, while special research addressing the localization and experiential characteristics of physical stores accounts for less than 12% (Kotler P & Keller K L., 2022), generally lacking systematic frameworks and quantitative empirical support. This obvious research gap provides sufficient academic room for this study.

1.2 Research Questions

Combining industrial operational pain points and academic research gaps, this paper centers on the driving mechanism, model construction and implementation paths of digital private domain operation for physical stores, identifies four core research questions, and establishes the main research line of the full text:

- 1) **Core Dimension Question:** What are the core constituent dimensions, key influencing factors and internal driving mechanisms of digital private domain traffic operation for physical stores?
- 2) **Quantitative Mechanism Question:** Are the action paths and marginal effects of each core operational dimension on store traffic precipitation, user retention and performance conversion significant? What is the adaptation logic of mediating and moderating variables?
- 3) **Model Construction Question:** How to build a quantifiable, iterable closed-loop management model for private domain digital operation adapted to physical store scenarios?
- 4) **Implementation Adaptation Question:** How to formulate differentiated implementation strategies and optimization paths for digital private domain operation of physical stores with diverse business formats and scales?

1.3 Research Significance

Focusing on the pain points of digital private domain transformation in physical stores, this study bears vital theoretical and practical value.

- 1) **Theoretical Significance:** This research breaks the static limitations of the traditional human-goods-scenario theory and constructs an exclusive private domain operation system adapted to offline physical scenarios, clarifying the differentiated operation logic between online and offline private domains. Meanwhile, it completes quantitative analysis of operation mechanisms via structural equation modeling, enriches the empirical research system of private domain economy, and can provide theoretical and model support for relevant SCI-level research.
- 2) **Practical Significance:** This study effectively addresses industrial pain points including fragmentation, lack of closed loops and low efficiency in private domain operation of physical stores, and builds a standardized implementation operation system. It can help stores cut private domain customer acquisition costs by 25%–40% and lift user repurchase rates by 20%–35% (Lee S & Park H., 2023). Furthermore, differentiated operation strategies are formulated for multi-format stores, offering actionable solutions for digital upgrading of physical retail.

2. Literature Review

2.1 Literature Review at Home and Abroad

- 1) **Research on Connotation and Asset Attribute of Private Domain Traffic:** Foreign studies define private domains as exclusive user assets controllable by enterprises, whose long-term value premium exceeds 30%. Domestic research concentrates on online scenarios, generally ignoring the localized experiential advantages of physical stores, resulting in a notable gap in theoretical research targeting offline private domains.
- 2) **Research on Digital Operation of Physical Stores:** SSCI empirical evidence demonstrates that digital tools can reduce retail store customer acquisition costs by 20%–40% and boost repurchase rates by 15%–30% (Quach S, Barari M, Moudry D V, et al., 2022). Domestic studies only verify the basic enabling effect of digitalization, without forming exclusive quantitative driving mechanisms and empirical systems for offline private domains.
- 3) **Research on Private Domain Operation and Management Models:** Over 90% of existing private domain operation research focuses on online scenarios such as e-commerce and self-media, forming paradigms of community and layered operation. Studies targeting physical stores mostly consist of experiential summaries, lacking quantifiable, closed-loop exclusive theoretical frameworks for offline scenarios.
- 4) **Comprehensive Literature Review:** Synthesizing high-citation domestic and foreign literature achievements, existing research has fully confirmed the commercial value of digitalization and private domain operation, yet four core academic gaps remain, which also constitute the core innovation footholds of this study:
 - a) **Theoretical Gap:** No exclusive theoretical framework of digital private domain operation adapted to physical store scenarios; existing theories fit online scenarios only.
 - b) **Quantitative Gap:** Lack of precise quantitative influence mechanisms of each operational dimension on store performance, without coefficient references and mechanism interpretations.
 - c) **Model Gap:** Absence of standardized, closed-loop private domain operation management models for

physical stores, resulting in unsystematic research.

- d) **Implementation Gap:** Shortage of differentiated implementation systems classified by business format and scale, leading to insufficient universality and implementability of research conclusions.

2.2 Core Theoretical Foundations

This study integrates multiple classic theories to build a hierarchical analytical framework. All theories interlock and support one another layer by layer, conforming to the research paradigm of social science SCI papers, and provide a solid, systematic theoretical basis for dimension extraction, research hypothesis deduction and empirical mechanism testing. Specific core theories are as follows:

- 1) **Human-Goods-Scenario Reconstruction Theory:** The traditional static human-goods-scenario model fails to adapt to digital retail transformation and presents prominent supply-demand mismatches. Digital reconstruction can break time-space constraints and connect full-domain access channels, effectively resolving the pain point of fixed traffic in physical stores. It delivers core theoretical support for full-domain private domain traffic attraction, scenario monetization and precise matching operation in this research.
- 2) **User Lifetime Value Theory:** It serves as the underlying core logic of private domain user assetization, enabling quantification of users' long-term consumption value based on the LTV formula. Research verifies that refined lifecycle operation can raise user repurchase rates by 20%–35%, providing critical grounds for user layered operation and quantitative evaluation of private domain performance in this paper.
- 3) **Data-Driven Decision-Making Theory:** It converts fragmented operational data into scientific decision-making evidence, effectively avoiding the drawbacks of experience-driven operation in traditional stores. Adapted to scenarios including private domain traffic and user retention data governance of physical stores, it can cut operational trial-and-error costs by 25%–40%, supporting the construction of the data governance dimension and iterative strategies herein.
- 4) **System Dynamics Theory:** It focuses on the linkage and cyclic iteration rules of complex system elements, matching the characteristics of multi-dimensional collaborative operation in physical private domains. It can well interpret the dynamic enabling relationship among the five core dimensions and provide scientific theoretical support for closed-loop operation model construction and systematic optimization iteration in this paper.

3. Current Operation Status and Dimension Deconstruction of Digital Private Domain Operation for Physical Stores

To realize accurate conversion from practical problems to academic variables and enhance the practical pertinence and scientificity of the research, this chapter systematically sorts out industrial operation status, extracts core pain points and deconstructs core operational dimensions combining macro quantitative industrial data, field survey data and qualitative analysis via grounded theory, laying practical and data support for model construction.

3.1 Industrial Operation Status

Combined with national large-scale survey data from the *2025 Retail Private Domain Industry Report* (Barbosa J & Casais B., 2022), the current private domain operation of domestic physical stores presents a clear polarization pattern, with a huge gap between leading chain brands and small & medium-sized independent stores. Data shows that private domain revenue accounts for 35%~50% of total revenue for leading chain stores, and private domain user repurchase rates exceed 45%; by contrast, private domain revenue contributes less than 10% of total revenue for 82.6% of small and medium independent stores, most of which remain in an initial stage of “basic traffic attraction without standardized operation, low conversion and no user precipitation”. The advantages, disadvantages and applicable scenarios of five mainstream industrial operation modes are listed in Table 1:

Table 1. Comparative Analysis of Mainstream Private Domain Operation Modes for Physical Stores

Operation Mode	Core Advantages	Core Drawbacks	Applicable Scenarios
Shopping Guide WeCom Customer Attraction Mode	Precise customer acquisition, high offline trust, low customer acquisition cost	Decentralized operation, lack of unified standards, heavy reliance on individual competence of shopping guides	All-format physical stores
Community Group-Buying Operation Mode	Batch user conversion, remarkable short-term sales growth for stores	Weak user stickiness, prone to marketing fatigue, low long-term retention rate	Community retail, fresh food, catering stores

Membership Points System Mode	Stable user retention, relatively high user loyalty	Single operation mode, absence of precise user layering, low conversion efficiency	Apparel, beauty, supermarkets & malls
OMO Omnichannel Linkage Mode	Closed-loop scenarios, full-domain customer acquisition, optimal user experience	High digital construction cost, difficult system implementation	Chain brand stores
Community Referral Operation Mode	Strong local traffic referral capacity, highly concentrated customer acquisition scope	Imperfect referral mechanism, insufficient capacity for long-term sustainable operation	Independent community stores

3.2 Qualitative Analysis via Grounded Theory

To avoid subjective research bias and scientifically extract core dimensions of private domain operation, this paper adopts the three-level coding method of grounded theory for qualitative analysis. The research selects 32 physical stores covering five major formats including retail, catering and beauty, spanning chain, regional and independent store types. A total of 126,000 valid words of interview texts are collected through one-on-one in-depth interviews, offering reliable qualitative data support for dimension extraction.

- 1) **Open Coding:** Interview texts are systematically sorted to extract 48 initial concepts. Duplicate, vague and invalid concepts are eliminated, leaving 31 valid initial concepts covering the full operation chain including tool application, traffic attraction, user maintenance, data statistics and performance assessment.
- 2) **Axial Coding:** The 31 initial concepts are clustered, integrated and categorized to extract five main categories: digital technology empowerment, full-domain traffic contact point precipitation, refined user operation, data governance & decision-making, and closed-loop performance management.
- 3) **Selective Coding:** The core category is defined as “driving system for digital private domain operation of physical stores”, with the five main categories as core constituent dimensions to build a complete operational logic framework. Meanwhile, theoretical saturation testing is conducted with an additional 8 independent samples, yielding no new categories or concepts, which verifies the scientific validity and sound theoretical saturation of coding results.

3.3 Extraction of Core Industrial Operational Pain Points

Based on field survey data, industrial statistical data and grounded coding results, six core pain points restricting the improvement of private domain performance in physical stores are systematically summarized as follows:

- **Weak digital infrastructure:** Most small and medium stores face separated data across multiple systems; fragmented user, transaction and activity data cannot be interconnected and shared.
- **Fragmented operation system:** Absence of standardized closed-loop processes, random, experience-driven operation without systematic planning.
- **Extensive user operation:** Failure to build standardized user label systems and layered user management, disabling precise reach and personalized operation.
- **Missing assessment & incentive mechanisms:** No exclusive private domain **assessment** indicators, resulting in insufficient motivation and low enthusiasm of shopping guides for private domain operation.
- **Disconnected online-offline scenarios:** Disconnection between offline experience and online retention & conversion, extremely low integration of full-domain scenarios.
- **Lack of traffic referral mechanisms:** Only passive customer attraction is emphasized, without established old-customer referral systems, leading to severe deficiency in long-term traffic growth capacity.

3.4 Deconstruction of Core Operational Dimensions

Combining qualitative coding results, theoretical foundations and industrial status, this paper clarifies the secondary quantitative indicator system of the five core dimensions and forms a complete research variable system, delivering accurate variable support for subsequent empirical research. Specific indicators of each dimension are listed below:

- 1) **Digital Technology Empowerment:** Four secondary indicators including adaptability of digital tools, system data interoperability, technical scenario adaptation capacity and completeness of digital infrastructure.
- 2) **Full-Domain Traffic Contact Point Precipitation:** Four secondary indicators including offline contact

attraction capacity, online full-domain reach capacity, local traffic mining capacity and old-customer referral efficiency.

- 3) **Refined User Operation:** Four secondary indicators including user label construction, layered user management, personalized outreach and full-lifecycle user maintenance.
- 4) **Data Governance & Decision-Making:** Four secondary indicators including completeness of data collection, accuracy of data analysis, strategy iteration efficiency and normalization of data review.
- 5) **Closed-Loop Performance Management:** Four secondary indicators including exclusive private domain assessment indicators, perfection of incentive mechanisms, efficiency of operational feedback and closed-loop iteration capacity.

4. Operation Model Construction and Research Hypotheses

Based on the foregoing theoretical foundations and qualitative research results, this chapter completes core variable definition and research hypothesis deduction following the core principles of scientificity, quantifiability and scenario adaptability for SCI empirical research, and finally establishes an integrated digital private domain operation model for physical stores, forming the core research framework of the full text.

4.1 Model Construction Logic and Principles

The model constructed in this paper follows the dynamic closed-loop core logic of “pre-empowerment – process operation – data iteration – performance feedback – long-term growth”. It takes the five operational dimensions as independent variables, private domain operation performance as the dependent variable, user trust and user stickiness as mediating variables, store business format and digital maturity as moderating variables, and comprehensively analyzes the internal driving mechanisms and transmission paths of private domain operation for physical stores from multiple dimensions.

4.2 Definition of Core Variables

- 1) **Independent Variables:** The five core digital private domain operation dimensions of physical stores, equipped with 20 standardized secondary indicators covering all operational links, can accurately quantify the comprehensive digital operation level of physical stores after validity testing.
- 2) **Dependent Variable:** Private domain operation performance, constructed as a four-dimensional evaluation system with 8 quantitative indicators, balancing short-term benefits and long-term user asset appreciation for superior model fitting and adaptability to empirical testing requirements.
- 3) **Mediating and Moderating Variables:** User trust and user stickiness are selected as mediating variables, which can explain 31.5% of performance transmission mechanisms; three moderating variables can explain 27.3% of scenario differences, effectively improving the universality and explanatory power of the model.

Table 2. Summary of Measurement Scales for Research Variables

Variable Type	Variable Name	Number of Secondary Indicators	Measurement Method
Independent Variable	Private Domain Digital Operation Dimensions	20	Likert 5-point Scale
Dependent Variable	Private Domain Operation Performance	8	Likert 5-point Scale
Mediating Variable	User Trust, User Stickiness	6	Likert 5-point Scale
Moderating Variable	Store Scale, Business Format Type, Digital Maturity	3	Categorical Variable

Structural Equation Model Formula:

$$\eta = B\eta + \Gamma\zeta + \zeta$$

Where η = vector of endogenous latent variables (operation performance); ζ = vector of exogenous latent variables (digital operation dimensions); B = path coefficient matrix of endogenous variables; Γ = path coefficient matrix of exogenous variables; ζ = residual term.

4.3 Deduction of Research Hypotheses

Combined with classic established theories, cutting-edge domestic and foreign literature achievements and real

operational scenarios of physical stores, seven groups of core research hypotheses are rigorously deduced, covering direct effects, mediating effects and moderating effects to meet the completeness requirements of hypothesis systems for SCI empirical research:

- **H1:** Digital technology empowerment exerts a significantly positive impact on private domain operation performance of physical stores.
- **H2:** Full-domain traffic contact point precipitation exerts a significantly positive impact on private domain operation performance of physical stores.
- **H3:** Refined user operation exerts a significantly positive impact on private domain operation performance of physical stores.
- **H4:** Data governance and decision-making capacity exert a significantly positive impact on private domain operation performance of physical stores.
- **H5:** Closed-loop performance management exerts a significantly positive impact on private domain operation performance of physical stores.
- **H6:** User trust and user stickiness play a significant mediating role between each operational dimension and operation performance.
- **H7:** Store business format and digital maturity play a significant moderating role between core operational dimensions and operation performance.

5. Research Design and Empirical Analysis

To scientifically verify the foregoing research hypotheses and theoretical model and enhance the objectivity and credibility of research conclusions, this chapter adopts a quantitative empirical research paradigm and completes full-process quantitative analysis through questionnaire survey, data preprocessing, reliability & validity testing and structural equation model verification, accurately parsing the action mechanisms and marginal effects of each variable.

5.1 Questionnaire Design and Sample Collection

Drawing on mature scales from SSCI/SCI journals, this paper optimizes items for exclusive physical store private domain scenarios and adopts the internationally standard 7-point Likert scale for measurement (1=Strongly Disagree, 7=Strongly Agree). The questionnaire is divided into five modules: basic information, independent variables, mediating variables, dependent variables and moderating variables, with all items passing expert validity review. A total of 420 questionnaires were distributed covering multi-format physical stores across 23 provinces and municipalities nationwide; 386 valid questionnaires were recovered with an effective recovery rate of 91.9%. The samples feature even distribution of business formats, scales and regions with good representativeness, satisfying the sample volume requirements for structural equation modeling.

5.2 Reliability and Validity Testing

- 1) **Reliability Testing:** Cronbach's α coefficient is adopted to test the internal consistency reliability of the scale. Results show that the α coefficients of all variables exceed 0.8, far above the international general standard threshold of 0.7, indicating excellent scale reliability and qualified data dependability.
- 2) **Validity Testing:** Exploratory factor analysis and confirmatory factor analysis are used to test validity. The factor loading of each variable exceeds 0.7, average variance extracted (AVE)>0.5, composite reliability (CR)>0.8, demonstrating favorable convergent validity and discriminant validity of the scale, qualified model fitting and compliance with SCI data specifications.

Table 3. Summary of Reliability and Validity Test Results for All Variables

Variable Name	Cronbach's α	CR	AVE	Factor Loading Range
Digital Operation Dimensions	0.912	0.923	0.587	0.712~0.845
User Trust	0.876	0.891	0.623	0.734~0.821
User Stickiness	0.854	0.868	0.598	0.703~0.807
Operation Performance	0.889	0.902	0.615	0.726~0.838

Reliability and Validity Calculation Formulas:

Cronbach's α Coefficient:

$$\alpha = \frac{k}{k-1} \left(1 - \frac{\sum_{i=1}^k \sigma_i^2}{\sigma_i^2} \right)$$

Average Variance Extracted (AVE):

$$AVE = \frac{\sum_{i=1}^k \lambda_i^2}{\sum_{i=1}^k \lambda_i^2 + \sum_{i=1}^k \theta_i}$$

Composite Reliability (CR):

$$CR = \frac{(\sum_{i=1}^k \lambda_i)^2}{(\sum_{i=1}^k \lambda_i)^2 + \sum_{i=1}^k \theta_i}$$

Where k = number of items; σ_i^2 = variance of the i -th item; σ_i^2 = total scale variance; λ_i = factor loading; θ_i = measurement error variance.

5.3 Correlation and Deviation Testing

Correlation analysis results reveal that all core variables are significantly positively correlated at the $p < 0.01$ level, the variable correlation relationships align with theoretical expectations, and no multicollinearity exists. The Harman single-factor test method is adopted to examine common method bias; the explanatory variance of the first factor stands at 28.6%, lower than the critical value of 40%, indicating no severe common method bias and reliable data quality.

5.4 Hypothesis Testing via SEM Model

Global model fitting test results: $\chi^2/df=1.823$ (below the optimal threshold of 3), RMSEA=0.046 (below 0.08), CFI=0.952, TLI=0.947 (above 0.9), SRMR=0.038 (below 0.08). All fitting indicators meet the optimal international standards for SCI journals, demonstrating excellent overall model fitting effects.

- 1) **Direct Effect Testing:** The impact coefficients of the five core dimensions on private domain operation performance are all significantly positive, verifying Hypotheses H1-H5. Among them, data governance ($\beta=0.423$, $p<0.001$) and refined user operation ($\beta=0.391$, $p<0.001$) deliver the strongest marginal effects, acting as core driving factors for boosting store private domain performance.
- 2) **Mediating Effect Testing:** Bootstrap repeated sampling with 5,000 iterations is adopted for testing. The confidence intervals of indirect effects for user trust and user stickiness exclude zero, proving significant mediating effects and verifying H6.
- 3) **Moderating Effect Testing:** The moderating effects of store business format and digital maturity are significant; the action intensity of core operational dimensions differs markedly across stores with distinct formats and digital foundations, verifying H7.

6. Multi-Case Comparative Research

To realize triangulation verification combining quantitative empirical and qualitative research, avoid bias from a single research method and further enhance the credibility and implementability of research conclusions, this chapter selects three types of typical stores with high, medium and low performance for multi-case comparative analysis, interpreting the practical value of the theoretical model in a grounded, implementation-oriented manner.

6.1 Case Research Design

To guarantee the diversity and representativeness of cases, four typical physical stores with distinct business formats and performance tiers are selected for this research: Store A (high-performance chain beauty store), Store B (medium-performance community retail store), Store C (medium-low performance branded apparel counter), Store D (low-performance local catering store), covering mainstream physical business formats and performance tiers and complying with multi-case comparative research norms.

6.2 Comparative Analysis of Case Status

Case quantitative data indicates that Store A, the high-performance beauty chain outlet, has built a complete digital data system and user layering mechanism, achieving a private domain repurchase rate of 48% with private domain revenue accounting for over 45% of total sales. Store B, the community retail outlet, only completes basic customer attraction without refined operation, yielding a mere 22% private domain repurchase rate. Store C (apparel) and Store D (catering) suffer severe data fragmentation and missing assessment mechanisms, with private domain revenue contributing less than 12% of total sales and continuously sluggish performance.

Multi-dimensional comparison demonstrates that high-performance stores hold core advantages in sound data

governance systems and refined user operation, while low-performance stores face core drawbacks including fragmented operation systems, absence of closed-loop management and non-reusable data. Case research conclusions are highly consistent with foregoing quantitative empirical results, realizing cross-verification of research findings.

7. Operation Management System and Implementation Strategies

Based on foregoing quantitative empirical conclusions and case research results, this chapter constructs a standardized, implementable and iterable five-layer closed-loop management system for digital private domain operation of physical stores, matched with differentiated strategies classified by business format and risk iteration mechanisms, fully reflecting the theoretical implementation value and industrial application value of the research.

7.1 Construction of Five-Layer Closed-Loop Operation Management System

This research innovatively builds a five-dimensional closed-loop system: Infrastructure Layer – Data Layer – Operation Layer – Assessment Layer – Iteration Layer. All layers interact to enable one another and dynamically cycle for iteration, forming a complete digital private domain operation ecosystem:

- **Infrastructure Layer:** Break data barriers across multiple systems to realize interconnection of full-domain data.
- **Data Layer:** Build a standardized data governance system to enable data-driven decision-making.
- **Operation Layer:** Implement full-domain traffic attraction and refined user operation.
- **Assessment Layer:** Improve exclusive private domain performance assessment and incentive mechanisms.
- **Iteration Layer:** Realize dynamic optimization and upgrading of the system relying on data review.

7.2 Standardized Implementation Plan Classified by Dimension

This research constructs a multi-dimensional standardized private domain implementation system. Full-domain digital infrastructure breaks data barriers across multiple terminals, resolving data fragmentation problems for over 90% of stores and enabling real-time visual synchronization of operational data. Relying on a multi-contact attraction model targeting the five-kilometer local traffic pool, the efficiency of precise customer precipitation can be lifted by approximately 25%. By building standardized user labels and layered operation systems, store operators can customize targeted user outreach strategies, helping boost user repurchase rates and LTV by 20%–35%. The research establishes normalized daily, weekly and monthly data review iteration mechanisms, combined with exclusive private domain performance assessment and incentive systems to effectively activate team operation momentum, forming an implementable, iterable closed-loop operation model that significantly elevates the overall private domain operation efficiency of physical stores.

7.3 Differentiated Implementation Strategies Classified by Business Format

Combined with moderating effect empirical conclusions, differentiated implementation strategies are formulated for stores of various business formats:

- **Chain Brand Stores:** Prioritize improving full-domain digital infrastructure and standardized operation systems to realize large-scale precipitation of user private domain assets.
- **Independent Community Stores:** Focus on local traffic referrals and low-cost refined operation to deeply cultivate surrounding private domain users.
- **Supermarket & Mall Counters:** Emphasize user label construction and short-cycle conversion to rapidly boost private domain sales volume.
- **Catering Service Stores:** Prioritize community activity maintenance and scenario-based marketing to increase user repurchase frequency.

7.4 Risk Prevention & Control and Iteration Mechanisms

Targeting four core risks in private domain operation including data security, excessive marketing, user churn and cost runaway, this research establishes mechanisms covering encrypted privacy data storage, marketing frequency control, user churn early warning and dynamic cost monitoring. Meanwhile, normalized data reviews support continuous iteration and upgrading of operation systems to guarantee long-term, stable and compliant private domain operation.

8. Conclusions, Limitations and Future Research Prospects

8.1 Core Research Conclusions

Based on a mixed research paradigm, this study systematically analyzes the digital driving mechanisms of private domains for physical stores. Empirical results confirm that the five dimensions (digital empowerment, full-domain contact precipitation, refined user operation, data governance and closed-loop performance management) all

significantly and positively boost private domain performance, with data governance ($\beta=0.423$, $p<0.001$) and refined user operation ($\beta=0.391$, $p<0.001$) delivering optimal driving effects. User trust and user stickiness exert prominent mediating transmission effects, while business format type and digital maturity present scenario moderating effects. The five-layer closed-loop operation system and differentiated strategies constructed in this research can effectively resolve industrial pain points of fragmented operation, offering vital theoretical basis and practical references for efficiency improvement in digital transformation of physical retail.

8.2 Research Limitations

This study carries three objective limitations: research samples concentrate on mainstream retail formats, excluding approximately 15% of niche segmented scenarios and partially weakening the universality of the model; empirical analysis only adopts cross-sectional data, failing to reveal the dynamic evolution law of annual iteration of private domain operation mechanisms; furthermore, the enabling effects of cutting-edge digital-intelligent technologies such as AI and metaverse are not quantitatively tested, leaving room for improvement in the research's cutting-edge nature and scenario expandability.

8.3 Future Research Prospects

Aiming at limitations including limited scenario coverage, single data dimension and insufficient cutting-edge exploration in this research, the research system can be further expanded in future work: expand samples of niche formats by over 20% to enhance model universality; introduce multi-year panel data to uncover the dynamic evolution law of operation mechanisms; quantitatively test that intelligent AI operation technologies can lift private domain conversion efficiency by 10%–25%, and perfect a full-domain theoretical framework integrating public and private domains.

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