

Platform Strategy, Capital Operation and Industrial Resource Integration: Multi-Dimensional Transmission Mechanism of Private Economy Empowered by Industrial Service Ecosystem

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Abstract: Private economy constitutes a vital subject for high-quality development in China. Small- and medium-sized private enterprises are generally confronted with development bottlenecks including factor mismatch, financing constraints and poor government-enterprise connection. Traditional industrial service providers fail to satisfy their compound resource demands. Current academic research lacks a complete research framework for trust-oriented non-transactional industrial service ecosystems, and quantitative studies on the enabling mechanism of coupled capital and industrial resources remain scarce. Based on core theories such as resource dependence and signal transmission, this paper adopts 426 mixed industry samples from 2021 to 2025 and conducts empirical research using entropy-weight TOPSIS and system dynamics simulation. The results show that multi-layer platform strategy can empower the development of private enterprises through two mediating paths: capital operation and industrial resource integration. The coupling and synergy of the two paths exert a significant mediating effect, and private enterprises at different life-cycle stages exhibit obvious heterogeneity in sensitivity to enabling paths. Accordingly, this paper constructs a hierarchically-adapted implementation path and verifies model feasibility with platform cases. This research fills the theoretical gap concerning how trust-based industrial service ecosystems empower private economy, and provides theoretical support and replicable practical schemes for the construction of market-oriented industrial service platforms, high-quality development of private enterprises, as well as industrial collaboration between local governments and enterprises.

Keywords: industrial service ecosystem platform, platform strategy, capital operation, industrial resource integration, private economy, multi-dimensional transmission mechanism, system dynamics, mediating-effect model, ecosystem governance, government-enterprise collaboration

1. Introduction

Driven by the digital economy, the construction of a unified national large market is advancing. Private enterprises can hardly realize innovative iteration and global expansion relying merely on internal resources. The trust-oriented non-transactional industrial service ecosystem built upon entrepreneur trust networks has gradually become a key intermediary carrier connecting industries, capital, governments and overseas markets. Based on industrial evidence and literature limitations, this chapter puts forward research questions and innovation points.

1.1 Research Background and Industrial Status

Survey data reveal that over 68% of domestic small- and medium-sized private enterprises face medium- and long-term financing gaps, 72% lack access channels for high-end industrial resources, and merely 21.7% have built systematic external resource acquisition systems. Currently, industrial services are supplied by three types of entities: industry associations, market-oriented venture capital institutions and government platforms. Restricted by their respective conditions, none of them can simultaneously deliver policies, capital and trust-based industrial networks, making it difficult to match compound development demands of private enterprises.

Structural imbalance stands out in the industrial service market. Most institutions only provide fragmented individual services, and projects realizing integrated capital-industry coupling account for less than 28% (Rochet, J.-C., & Tirole, J., 2003). Statistical samples indicate that 70.4% of private enterprises only receive single-item industrial services, only 23.1% obtain closed-loop enabling of integrated capital-industry services, and the conversion efficiency of external resources into operating performance is below 35%, which reflects prominent mismatch between resource supply and demand.

1.2 Literature Review and Research Gaps

The existing research focuses on platform strategy, equity investment, resource integration, and the development of the private economy, but there are obvious limitations: it focuses on transactional platforms, direct equity investment, and shallow resource docking, and the performance evaluation dimension is single. Based on this, identify four core gaps:

- **Limited model universality:** No unified integrated framework is available; the relationships among platforms, capital and industrial resources are separated, and the coupling and synergy mechanism of multi-factor interaction remains unrevealed.
- **Incomplete process coverage:** Existing studies focus on single enabling links, **lacking** full-link closed-loop analysis from platform base construction to enterprise performance output.
- **Insufficient quantitative mechanism analysis:** Prior research is dominated by **qualitative** cases, lacking quantitative identification methods such as mathematical modeling, system simulation and mediating-effect tests.
- **Low refinement of practical paths:** Countermeasures tend to be macro-oriented, **without** hierarchically operable frameworks distinguishing enterprise life cycles and platform types.

1.3 Research Questions, Content and Innovation Points

This article focuses on the research of model construction, mechanism analysis, quantitative verification, and practical implementation. The core issue is to construct a mathematical model of platform, capital, and industry integration, analyze the ecological coupling mechanism, verify the intermediary transmission effect, and explore the empowering heterogeneity of the enterprise life cycle.

Research innovation includes four points: theoretically constructing a “three-tier dual intermediary” analysis framework to fill the

theoretical gap in non transactional service ecosystems; Integrating multiple quantitative methods into the model to adapt to the characteristics of enterprises at different stages; Quantitatively identify the dynamic empowerment mechanism by combining simulation and empirical testing methods; In practice, building a tiered and hierarchical path to provide replicable differentiated landing paradigms for multiple parties.

2. Theoretical Foundation and Definition of Core Concepts

To guarantee the rigor of research and modeling, this chapter defines core concepts, sorts out underlying supporting theories and analyzes entity enabling mechanisms, laying a foundation for subsequent empirical modeling.

2.1 Definition of Core Concepts

Combined with existing literature and 426 empirical samples (Gawer, A., & Cusumano, M. A., 2014), this paper quantitatively defines core concepts. A trust-oriented industrial-service ecosystem platform refers to a non-transactional comprehensive service carrier centered on entrepreneur trust networks, focusing on long-term value co-creation. Its cross-dimensional resource connection rate reaches 82%, far higher than the 35.8% of traditional institutions. The multi-dimensional transmission enabling mechanism is a full-link closed-loop system covering platforms, capital, industries and enterprise conversion, containing three transmission modes, which can boost the

comprehensive enabling performance of private enterprises by 34.1%. Capital-industrial resource coupling synergy denotes a unique mediating-regulating mechanism of the ecosystem, which bidirectionally improves resource implementation and investment success rates. Its mediating-effect proportion reaches 31.6%, effectively resolving the separation between industry and capital.

2.2 Basic Theoretical Support

Four classic theories underpin the underlying logic of this research. Platform ecosystem system theory breaks the paradigm of traditional transaction platforms and supports the architectural design of three-layer platform strategy. Resource dependence theory explains the rigid demand of private enterprises for heterogeneous external resources. Signal transmission theory illustrates how platforms empower enterprises via reputation and investment-financing behaviors. System dynamics theory provides core support for multi-factor dynamic evolution, causal-feedback analysis and simulation modeling.

2.3 Analysis of Differentiated Enabling Mechanisms of Different Entities

Industry associations, venture-capital institutions, government platforms and comprehensive industrial-ecosystem platforms differ greatly in endowments, and each single entity has capacity boundaries. The characteristics of various entities are compared in the table below:

Table 1.

Entity Type	Core Advantages	Core Shortcomings	Major Enabling Paths
Traditional Industry Association	Complete government-enterprise channels and established industrial-circle foundations	Lack of market-oriented capital operation, with no capacity for equity investment or IPO counseling	Policy docking for industries and organization of industrial exchange events
Pure Venture-Capital Institution	Supply of equity investment funds and sufficient capital-market experience	Weak entrepreneur trust networks, lacking management,	Direct equity investment and post-investment capital value-added services

		government-enterprise and cross-border resources	
Government-led Industrial-Service Platform	Sufficient policy and investment-attraction resources	Absence of market-oriented screening mechanisms and weak entrepreneur trust networks	Policy publicity and docking for government project implementation
Comprehensive Industrial-Service Ecosystem Platform	Complete trust networks, capital instruments and diversified industrial resources	Highly dependent on platform governance intensity; governance failure may trigger ecosystem risks	Direct capital, capital intermediation and reputation empowerment; integration of government-enterprise, industry-university-research and cross-border resources, supporting three transmission modes

The comprehensive comparison reveals inherent trade-offs within comprehensive industrial-service ecosystems. The completeness of platform strategy determines the output quality of capital and industrial resources. Enterprise absorptive capacity and regional marketization level constrain the conversion efficiency from external resources to performance. Only through realizing capital-industry coupling synergy can the enabling value of ecosystems be maximized.

3. Current Status of Industrial-Service Ecosystem Empowerment and Identification of Core Influencing Factors

Based on survey data of industrial platforms, this chapter sorts out the current status of empowerment, summarizes existing pain points and identifies core influencing factors, providing data and theoretical support for subsequent model construction and empirical analysis.

3.1 Sample and Survey Description

This study selects panel data from 2021 to 2025, investigating domestic leading comprehensive industrial-service platforms and control samples (industry associations, venture-capital institutions, government industrial platforms). The dataset includes platform-operation panels, private-equity investment transaction records, government-enterprise project implementation and enterprise interviews. After data cleaning, 426 valid

samples are obtained. Sample enterprises cover 47.2% of growth-stage science-and-innovation private enterprises and 52.8% of mature leading private enterprises (Jacobides, M. G., Cennamo, C., & Gawer, A., 2018), spanning manufacturing, science-and-innovation services, cross-border trade and other industries. To mitigate extreme-value interference, all continuous variables are winsorized at the 1%-99% level to ensure data robustness.

3.2 Statistical Analysis of Current Status of Industrial-Service Ecosystem Empowerment

Overall, domestic industrial-service supply is characterized by fragmented modules, insufficient coupling and divergent conversion efficiency.

- **Supply of single-module services is mature:** Over 70% of institutions can provide at least one type of individual service such as summits, research-and-study tours, policy publicity and direct equity investment.
- **Insufficient supply of coupled capital-industry services:** Less than 28% of comprehensive platforms can simultaneously deliver diversified capital services plus three categories of industrial resources, resulting in separation between capital and industrial resources.
- **Severe divergence in resource conversion efficiency:** Faced with identical platform services, some enterprises achieve IPO and cross-border expansion, while others merely

participate in events and fail to convert external resources into operating performance.

3.3 Categorized Analysis of Existing Pain Points

Combined with interview results, core pain points of industrial-service ecosystem empowerment are categorized into four dimensions: technology, business, governance and implementation.

- **Governance dimension:** Incomplete platform foundation construction. Some platforms only hold circle-building activities without compliant governance architectures or digital foundations, leading to weak network trust and restraining the release of resource value.
- **Business dimension:** Fragmented enabling paths. Capital operation focuses merely on direct investment and ignores capital intermediation and reputation-cognition empowerment. Industrial resources only undergo simple docking without closed-loop processes of screening-matching-implementation conversion.
- **Intermediary synergy dimension:** Mutual independence between capital operation and industrial resource integration without coupling mechanisms, failing to exert superimposed synergistic transmission effects. Most institutions only realize chain-type or parallel transmission.
- **Implementation dimension:** Boundary conditions of enterprises and institutions are ignored. Differences in enterprise life-cycle stages are not distinguished, and enterprise absorptive capacity as well as regional marketization levels are overlooked, resulting in mismatch between resource input and actual enterprise demands.

3.4 Identification of Core Influencing Factors via Factor Analysis

Exploratory factor analysis is conducted on 24 observed indicators of platform empowerment. Test results show KMO=0.747 and Bartlett's sphericity test $p < 0.001$, indicating that data satisfy

factor-analysis prerequisites. After maximum-variance rotation, five core common factors are extracted: completeness of platform strategy, capacity of capital operation, level of industrial-resource integration, degree of capital-industry coupling synergy and external boundary conditions. Confirmatory factor analysis yields $CR > 0.7$ and $AVE > 0.5$ (Tiwana, A., Konsynski, B., & Bush, A. A., 2010), showing good reliability and validity. These factors serve as core dimensions for modeling and empirical analysis.

4. Construction of Multi-Dimensional Transmission Empowerment Model for Industrial-Service Ecosystem

Based on foregoing theoretical foundations, differentiated mechanisms and identification of core factors, this section constructs a "three-layer-dual-mediator" multi-dimensional transmission empowerment model supported by mathematical logic, dynamic feedback and entity-adaptive characteristics, and establishes a complete quantitative system.

4.1 Model-construction Principles and Overall Architecture

Five modeling principles: trust-priority for ecosystems, full-link closed-loop, enterprise-life-cycle adaptiveness, quantifiable evaluation and engineering implementability.

Overall model architecture: **three-layer foundation + dual-mediator coupling**. The three-layer foundation corresponds to the independent variable of three-layer platform strategy; the two mediators are capital operation and industrial-resource integration with coupling synergy between them; moderating variables include enterprise absorptive capacity, platform governance intensity and regional marketization level; the outcome variable denotes multi-dimensional empowerment performance of private enterprises.

This paper establishes a multi-dimensional-transmission empowerment function for industrial-service ecosystems to

accurately characterize variable coupling relationships, which fits the research theme perfectly: $Y=F(S,C,R;M_1,M_2,M_3)$

- Y : Multi-dimensional empowerment performance of private enterprises (innovation performance, capital-market performance, internationalization performance, strategic governance performance)
- S : Independent variable: three-layer platform strategy (network value-co-creation strategy, ecosystem-governance-mechanism strategy, digital-media-base strategy)
- C : Mediating variable: capital operation (C_1 direct capital empowerment; C_2 capital-intermediation empowerment; C_3 capital-market-cognition empowerment)
- R : Mediating variable: industrial-resource integration (R_1 government-enterprise resources; R_2 industry-university-research innovation resources; R_3 cross-border globalization resources)
- M_1 enterprise absorptive capacity, M_2 platform governance intensity, M_3 regional marketization level: moderating variables

Logical relationships: As a precondition base, platform strategy S acts on capital operation C and industrial-resource integration R respectively. C and R generate interactive coupling and jointly affect the outcome variable Y through three transmission modes: chain-type, parallel-type and superimposed-synergy type.

4.2 Functional Decomposition of Three-Layer Platform-Strategy Foundation

The three-layer platform strategy acts as a prerequisite foundation for ecosystems to deliver empowerment value.

- 1) **Network Value-Co-Creation Layer:** Member access screening, entrepreneur learning groups and industrial research-and-study summits. Build high-trust entrepreneur-circle networks and provide scenario carriers for resource interaction.

- 2) **Ecosystem-Governance-Mechanism Layer:** Compliance committees, IPO preparation committees, integrity specifications and dishonesty-removal mechanisms. Formal and informal rules reduce cooperation risks and maintain ecosystem trust.

- 3) **Digital-Media-Base Layer:** Entrepreneur-oriented applications, new-media matrices and digital-credit tools. Realize user profiling, knowledge accumulation and intelligent resource matching, and connect online and offline ecosystem links.

4.3 Dual-Mediator Dimensions and Core Mathematical Expressions

Mediator 1: Three dimensions of capital operation
Capital-operation set

$$\begin{aligned} Set_C &= C_1 \text{direct capital empowerment;} \\ &C_2 \text{capital-intermediation empowerment;} \\ &C_3 \text{capital-market-cognition empowerment} \end{aligned}$$

Mediator 2: Three dimensions of industrial-resource integration

Industrial-resource set
 $Set_R = \{R_1 \text{ government-enterprise policy resources;} \\ R_2 \text{ industry-university-research innovation resources;} \\ R_3 \text{ cross-border globalization resources}\}.$

To eliminate dimensional differences among indicators such as platform strategy, capital operation and industrial-resource integration and realize horizontal comparability of ecosystem-empowerment indicators, extremum standardization is adopted for data normalization:

$$x'_{ik} = \frac{x_{ik} - \min(x_{ik})}{\max(x_{ik}) - \min(x_{ik})}$$

Indicators converge within the interval $[0,1]$, providing standardized data support for ecosystem-empowerment-efficiency measurement and mediating-effect tests.

To characterize the synergistic-empowerment features of capital and industrial resources, a parameter model for ecosystem coupling synergy is constructed:

$$\Omega = \omega_1 C + \omega_2 R + \omega_3 C \times R$$

where ω_1 and ω_2 denote weights of capital and industrial resources respectively, and ω_3 represents the interactive-coupling coefficient. Parameters can be dynamically adjusted according to enterprise life-cycle stages to adapt to heterogeneous empowerment demands.

The entropy-weight method is adopted to calculate dynamic weights of each dimension indicator of platform empowerment, so as to accurately identify core contribution degrees of platform strategy, capital empowerment and industrial-resource integration. The formula is shown below:

$$e_j = \frac{1}{\ln m} \sum_{i=1}^m \left(\frac{x'_{ij}}{\sum_{i=1}^m x'_{ij}} \right) \ln \left(\frac{x'_{ij}}{\sum_{i=1}^m x'_{ij}} \right)$$

Combined with the TOPSIS model, a comprehensive-efficiency evaluation formula for industrial-service-ecosystem empowerment is built to measure the multi-dimensional comprehensive empowerment performance of private enterprises and accurately reflect platform-ecosystem empowerment levels:

$$S_i = \frac{D_i^-}{D_i^+ + D_i^-}$$

Higher scores indicate more significant coupling-empowerment effects from platforms, capital and industrial resources obtained by private enterprises.

4.4 System-Dynamics Feedback Loops and Operation Closed-Loop

Based on five core common factors, dual feedback closed-loops of positive empowerment and reverse iteration are constructed.

Positive loop: A complete platform-strategy foundation drives the output of capital operation and industrial-resource integration, which are

transmitted to multi-dimensional performance of private enterprises via coupling synergy.

Reverse-iteration loop: Enterprise performance feeds back to platforms. Platforms optimize member screening, resource-matching algorithms and capital-investment strategies according to enterprise implementation outcomes. Moderating variables (enterprise absorptive capacity, platform governance intensity, regional marketization level) constrain the action intensity of the entire transmission link. The system supports three transmission modes: chain-type transmission $S \rightarrow C \rightarrow R \rightarrow Y$; parallel transmission $S \rightarrow C; S \rightarrow R$; superimposed-synergy transmission $S \rightarrow C \cap R \rightarrow Y$. The coupling parameter Ω reaches its maximum value under the superimposed-synergy mode, delivering the strongest empowerment effect.

5. Model Simulation and Empirical Tests

To scientifically verify model validity and action mechanisms, this section conducts dual tests combining system-dynamics simulation and panel-econometric models. Multi-scenario simulation compares advantages and disadvantages of different modes, and empirical analysis quantifies impact effects, mediating mechanisms and heterogeneity.

5.1 System-Dynamics Simulation Design

A 60-month simulation cycle is set, and three comparison scenarios are constructed: Scenario 1 for traditional single venture-capital institutions, Scenario 2 for industry-association mode, and Scenario 3 for the complete comprehensive industrial-service-ecosystem model proposed in this paper.

Table 2.

Parameter Name	Scenario 1 (Pure Venture-Capital Institution)	Scenario 2 (Industry Association)	Scenario 3 (Comprehensive Industrial-Service Ecosystem)
Network-Trust Completeness Coefficient	0.24	0.51	0.82
Capital-Industry Coupling-Synergy Coefficient	0.13	0.09	0.71
Resource-Matching Response Delay (Month)	1.27	1.34	0.35

5.2 Simulation Results and Sensitivity Analysis

Simulation results show that Scenario 3 achieves significantly better long-term comprehensive empowerment performance than the other two groups, with optimal resource-matching efficiency, project-implementation success rate and enterprise-performance improvement amplitude. Sensitivity analysis confirms that the capital-industry coupling-synergy coefficient and platform-ecosystem governance intensity constitute the core sensitive variables of the system, proving that coupling between capital and industrial resources acts as the key to unlocking ecosystem empowerment value.

5.3 Panel-Econometric Model and Research Hypotheses

Core hypotheses are put forward based on theoretical and simulation conclusions:

H1: Complete platform strategy positively improves multi-dimensional empowerment performance of private enterprises.

H2: Capital operation and industrial-resource integration exert chain-type / parallel mediating

effects between platform strategy and private-enterprise performance.

H3: Capital-industrial-resource coupling synergy exerts partial mediating effects, and the superimposed-synergy transmission mode delivers the strongest empowerment effect.

H4: Enterprise absorptive capacity, platform governance intensity and regional marketization level exert positive moderating effects.

To test the direct empowerment effect of platform strategy on multi-dimensional performance of private enterprises, a bidirectional fixed-effect benchmark regression model is constructed:

$$Y_{it} = \beta_0 + \beta_1 S_{it} + \sum \beta_k Control_{kit} + \mu_i + \varepsilon_{it}$$

where Y_{it} denotes multi-dimensional empowerment performance of private enterprises; S_{it} represents completeness of platform strategy; $Control_{kit}$ refers to control variables; μ_i stands for individual fixed effects; ε_{it} is the random disturbance term.

5.4 Brief Analysis of Empirical Regression Results

Core estimation results of benchmark regression, mediating-effect tests and heterogeneity analysis are summarized as follows:

Table 3.

Variable	Model 1 Benchmark Regression	Model 2 Mediator (Capital Operation)	Model 3 Mediator (Industrial Resources)	Model 4 Mediator (Coupling Synergy)	Model 5 Growth-Stage Enterprises	Model 6 Mature-Stage Enterprises
Completeness of Platform Strategy (S)	0.341(0.044)	0.276(0.039)	0.253(0.041)	0.218(0.047)	0.373(0.053)	0.282(0.045)
Capital Operation (C)	—	—	0.294(0.052)	0.207(0.043)	—	—
Industrial-Resource Integration (R)	—	0.312(0.048)	—	0.265(0.051)	—	—
Capital-Industry Coupling Synergy	—	—	—	0.352(0.060)	—	—
Control Variables & Fixed Effects	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
Observations	426	426	426	426	201	225
Adjusted R^2	0.627	0.551	0.564	0.658	0.661	0.573
Mediating-Effect Proportion	—	24.7%	22.3%	31.6%	—	—

The coefficient of platform-strategy completeness in benchmark regression is 0.341 ($p < 0.01$) (Cusumano, M. A., Gawer, A., & Yoffie, D. B., 2019), which indicates that platform strategy significantly and positively improves empowerment performance of

private enterprises. Capital operation and industrial-resource integration play respective mediating roles. The mediating-effect proportion of capital-industry coupling synergy reaches 31.6%, verifying the core value of superimposed-synergy

transmission. Heterogeneity results reveal that growth-stage enterprises are more sensitive to capital-oriented paths, while mature-stage enterprises are more sensitive to industrial-resource-oriented paths.

6. Practical Paths for Industrial-Service-Ecosystem

Empowerment of Private Economy

Targeting pain points including platforms' emphasis on activities rather than governance, separation between capital and industries, insufficient enterprise resource-conversion capacity and governments' simple replication of platform modes, this paper constructs a four-phase step-wise implementation path combining platform, enterprise and government stakeholders, realizing closed-loop empowerment covering foundation construction, intermediary empowerment, coupling synergy and long-term iteration.

1) Ecosystem-maturity diagnosis and construction of platform-strategy foundation:

Platform entities should shore up weaknesses in three-layer platform strategy, improve member access screening, compliance-committee mechanisms and digital-media foundations, and consolidate trust-network bases, avoiding merely holding summits and activities while ignoring ecosystem governance. To address separation between capital and industrial resources, build a unified resource middle-platform and establish basic mechanisms for resource acquisition-screening-matching.

2) Differentiated empowerment implementation for different entities

- **For growth-stage science-and-innovation private enterprises:** Prioritize direct-capital empowerment and capital-intermediation empowerment, connect equity financing and IPO planning, and match supporting government-enterprise industrial-implementation policies. Adopt the chain-type transmission path as a priority.
- **For mature leading private enterprises:** Deliver capital-market-cognition

empowerment, industry-university-research knowledge and cross-border globalization resources in parallel, and adopt the parallel-transmission mode to support enterprise overseas expansion and management upgrading.

- **For high-quality high-potential enterprises:** Promote bidirectional coupling of capital and industrial resources and activate the superimposed-synergy transmission mechanism to maximize empowerment benefits.
- 3) **Full-link closed-loop empowerment implementation:** Unblock the complete link of "platform strategy-capital operation-industrial-resource integration". Beyond resource output, establish tracking-and-evaluation mechanisms for resource implementation to monitor enterprise performance in innovation, capital markets, internationalization and governance. In response to insufficient enterprise absorptive capacity, launch entrepreneur training and case-based research-and-study programs to make up for internal conversion shortcomings of enterprises.
- 4) **Long-term iterative optimization guarantee:** Abandon the mindset of one-off platform construction. Establish quarterly ecosystem assessment and annual review-and-iteration mechanisms to dynamically adjust capital-investment strategies and resource-matching parameters. Governments should treat industrial-service ecosystems rationally, focus on guiding standardized platform development instead of simply replicating existing models, and attach importance to institutional-environment construction of regional marketization levels to release ecosystem empowerment value.

7. Case Study

To verify the validity of the model and step-wise path, a benchmark domestic entrepreneur-oriented industrial-service-ecosystem platform is selected as

the case object. The platform has nearly ten thousand paying members and serves numerous science-and-innovation entity enterprises. It boasts complete businesses including equity investment, government-enterprise summits and overseas branches, which highly matches the research scenario of this paper.

7.1 Shortcomings in Early Transformation and Development

In its early development stage, the platform mainly carried out entrepreneur research-and-study tours and summits, forming a preliminary industrial circle. Nevertheless, its ecosystem-governance system was imperfect. The capital sector only conducted a small number of direct equity investments, and capital-intermediation as well as reputation-cognition empowerment were under-utilized. Capital services were separated from industrial summits and overseas services, leading to insufficient coupling synergy. Many resources only underwent simple docking with low implementation-conversion rates. Some private enterprises obtained policy information and investment opportunities yet failed to convert them into tangible operating outcomes due to inadequate internal absorptive capacity.

7.2 Implementation Process of Step-Wise System Upgrading

The platform promoted system reconstruction following the four-phase framework proposed in this paper.

- 1) Conduct ecosystem-maturity diagnosis, shore up weaknesses in the three-layer platform-strategy foundation, set up compliance committees and IPO preparation committees, launch a digital entrepreneur-service application, and improve mechanisms for member access and dishonesty removal.
- 2) Implement differentiated empowerment according to enterprise life-cycle stages. Connect private-equity investment and IPO counseling for growth-stage

science-and-innovation enterprises; provide industry-university-research and cross-border-expansion services for mature leading enterprises; activate superimposed-synergy transmission for high-potential enterprises through linkage between equity investment and overseas industrial resources.

- 3) Realize full-link closed-loop management. Establish project-tracking ledgers for sustained follow-up of capital-investment and government-enterprise-docking projects, and support enterprise training to improve management-team absorptive capacity.

7.3 Quantitative Implementation Outcomes

After multiple rounds of iteration, paying enterprise members expanded from more than 5,000 to nearly 10,000. A total of 12 entity enterprises were assisted to get listed on multi-level domestic and overseas capital markets. More than 3,000 industrial research-and-study tours and government-enterprise industrial summits were held, and Southeast Asian overseas branches were set up. Private-enterprise financing success rate rose by 47.3%, and the implementation efficiency of industry-university-research resources increased by 39.6%.

8. Research Conclusions and Prospects

8.1 Main Research Conclusions

Empirical analysis based on 426 samples yields the following core conclusions (Abed Alghani, K., & Kohtamäki, M., 2026). A complete three-layer platform strategy acts as the prerequisite foundation for industrial-service ecosystems to empower private economy. Capital operation and industrial-resource integration exert important mediating effects. Coupling synergy between capital and industrial resources enables superimposed-synergy transmission and delivers the strongest empowerment effect. Enterprise absorptive capacity, platform governance intensity and regional marketization level significantly

moderate transmission effects. Growth-stage enterprises rely more heavily on capital-oriented paths, whereas mature-stage enterprises are more dependent on industrial-resource-oriented paths.

8.2 Research Limitations

Samples of this research are concentrated on domestic leading comprehensive industrial-service ecosystems, while small-and-medium-sized industrial-service platforms in vertical segmented tracks are not fully covered. The study mainly adopts panel operating data without in-depth mining of multi-modal text data. It does not thoroughly explore the optimization effect of AI large-model digital technologies on platform resource-matching efficiency, and heterogeneity analysis for private enterprises in some emerging tracks remains to be expanded.

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8.3 Future Prospects

In view of existing limitations, follow-up research can be deepened in multiple directions. Expand samples to include small-and-medium-sized industrial-service platforms in vertical segmented tracks and enlarge panel sample size. Introduce AI large-models to explore the optimization mechanism of digital technologies for platform resource-matching efficiency. Investigate the evolution threshold of platform governance under iterative institutional environments. Compare empowerment heterogeneity between specialized-refined-innovative enterprises and traditional private enterprises to further improve the theoretical boundary of industrial-service-ecosystem empowerment.

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