

Research on the Triple Dilemma of Digital Transformation in Private Enterprises and Pathways to Breakthrough

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Abstract

Driven by the global digital wave and national strategic initiatives, digital transformation has emerged as a pivotal force propelling economic growth and societal change. China places high importance on digital economic development, successively introducing multiple policies to advance the deep integration of digital technologies with the real economy. Against this backdrop, private enterprises-as key players in the national economy-face a digital transformation journey that not only impacts their own competitiveness but also serves as a vital pillar for achieving high-quality economic development and building a modern industrial system. However, in practice, numerous private enterprises face practical obstacles such as weak technological adaptability, significant funding pressures, and organizational coordination barriers, resulting in transformation progress lagging behind expectations. This study employs the Technology-Organization-Environment (TOE) framework and the Resource-Based View (RBV) to analyze the interactive relationship between external environmental pressures, technological barriers, internal resource constraints, and capability gaps in private enterprises' digital transformation. It reveals the formation and reinforcement mechanisms of a triple dilemma. Findings indicate a mutually reinforcing negative cycle among these dilemmas, with resource constraints, capability gaps, and ecosystem limitations serving as core drivers. To address these challenges, this study proposes a three-dimensional solution: constructing a tiered transformation pathway, establishing an ecosystem collaboration system, and implementing targeted policy empowerment. This framework offers theoretical guidance and practical reference for the digital transformation of private enterprises.

Keywords

Private Enterprises; Digital Transformation; Triple Dilemma; Ecosystem Synergy; Breakthrough Pathways.

1. Introduction

At present, China is at a critical juncture in advancing the great cause of national rejuvenation through the comprehensive advancement of modernization with Chinese characteristics. As the primary economic form following the agricultural and industrial economies, the digital economy has become a core force reshaping the global competitive landscape. The Third Plenary Session of the 20th CPC Central Committee further emphasized accelerating the development of the digital economy and promoting the deep integration of the digital economy with the real economy, thereby positioning digital transformation as a strategic engine for driving high-quality economic development. Private enterprises, as vital pillars of the national economy, now account for over 60% of GDP, contribute more than 50% of tax revenues, generate over 60% of technological innovations, and provide over 80% of urban

employment[1]. They are indispensable forces in advancing Chinese-style modernization. The success of private enterprises in digital transformation not only concerns their own survival and development but also serves as a strategic fulcrum for building a modern economic system and consolidating national competitive advantages.

Although national policies such as the 14th Five-Year Plan for Digital Economic Development and the Action Plan for Digital Transformation of Small and Medium-sized Enterprises have provided directional guidance and support systems, many private enterprises still face multiple challenges in practice, including insufficient willingness to transform, lack of resources and capabilities, and ineffective implementation. They are trapped in a dilemma of unwilling to transform, unable to afford transformation, and unable to execute transformation[2,3]. This predicament stems not merely from technological application issues but from the combined effects of contextual pressures and resource-capability imbalances. Existing research predominantly focuses on macro-policy impacts or large-enterprise transformation experiences, often neglecting the unique property rights structures, governance models, resource constraints, and capability gaps specific to private enterprises. There remains a lack of theoretical frameworks that systematically integrate external environmental pressures with internal resource conditions.

Therefore, this paper attempts to integrate the Technology-Organization-Environment (TOE) framework with the Resource-Based View (RBV) to construct a comprehensive analytical perspective[4,5]. On one hand, the TOE framework delineates the external technological barriers, market pressures, and institutional uncertainties confronting private enterprises in digital transformation. On the other hand, the Resource-Based View reveals the constraints formed by internal resource scarcity, capability gaps, and organizational inertia. From this perspective, the digital transformation dilemma of private enterprises is fundamentally the result of the resonance between external pressures and internal constraints. Based on this, this paper aims to systematically deconstruct the constituent dimensions, operational mechanisms, and interactive relationships of the triple dilemma faced by private enterprises[2,6]. It then proposes practical and actionable pathways to overcome this dilemma, addressing the existing research gap in insufficient attention to the unique context of private enterprises. This study provides valuable insights for policy formulation and corporate practice.

2. Cognitive Dilemma: Risk Aversion, Strategic Blind Spots, and the Root Causes of Hesitation to Shift

The cognitive dilemma primarily stems from private enterprises' risk-averse mentality and insufficient recognition of digital value during their digital transformation, leading to hesitation in decision-making-a reluctance to transform.

Enterprises commonly exhibit risk-averse tendencies, rooted in the lengthy investment-return cycles and unclear short-term benefits inherent in digital transformation processes[7]. Many private enterprises, especially small and medium-sized businesses, often adopt conservative operational strategies and maintain a wait-and-see attitude toward digital investments. Furthermore, factors such as data security risks, rising compliance costs, and rapid technological updates further intensify corporate caution, causing hesitation in the face of digital transformation[8].

At the cognitive level, enterprise management lacks a deep understanding of the strategic value of digital transformation, resulting in unclear transformation roadmaps and insufficient change leadership[9]. Some enterprises simplistically equate digitalization with implementing systems and purchasing software, overlooking its systemic role in restructuring business models, enhancing organizational capabilities, and building competitive advantages. Furthermore, lacking digital expertise, enterprises struggle to evaluate the applicability and potential benefits

of different technological solutions, further dampening transformation momentum. This cognitive limitation not only impedes decision-making efficiency but also risks steering enterprises toward misguided paths in the early stages of transformation, trapping them in a vicious cycle of significant investment with slow returns.

3. Resource Constraints: Financial Rigidity, Factor Shortages, and Structural Constraints That Prevent Transformation

The resource dilemma manifests primarily as financial constraints and shortages of key factors faced by private enterprises during digital transformation. This stems from structural characteristics such as small enterprise scale, financing difficulties, and insufficient talent reserves.

Funding-wise, digital transformation demands sustained and substantial investment across multiple stages, including hardware/software procurement, system integration, post-implementation maintenance, and upgrades. However, private enterprises-especially small and micro businesses-commonly grapple with limited financing channels and inadequate credit support[6,10]. Traditional financial institutions like banks often prioritize lending to state-owned or large enterprises, leaving private firms struggling to secure sufficient funding without collateral or credit guarantees. Furthermore, the long-term nature and uncertain returns of digital transformation make it difficult for enterprises to sustain investments with their own funds, leading many projects to stall early on due to funding shortages.

Regarding talent, digital technology professionals are concentrated in first-tier cities and large tech companies. Private enterprises, especially those in second- and third-tier cities, are at a distinct disadvantage in attracting and retaining versatile digital talent possessing both technical and managerial capabilities. Companies often lack systematic internal digital training programs, resulting in slow skill updates among existing staff who struggle to adapt to new technological workflows. Technologically, enterprises generally lack independent development capabilities. Reliance on external solutions frequently encounters practical challenges such as poor system compatibility, high integration complexity, and inadequate post-implementation support[3]. These resource constraints collectively form a hard barrier to transformation, preventing many companies from advancing beyond the resource threshold despite their willingness to transform.

4. Implementation Dilemmas: Organizational Inertia, Ecological Silos, and the Immovable Barriers of Reality

The implementation dilemma reflects the internal organizational barriers and external ecosystem constraints encountered by private enterprises during digital transformation, with the core issue being the conflict between traditional management models and the logic of digital operations.

Internally, digital transformation is not merely about technology adoption but represents a profound shift in organizational processes, authority structures, and even corporate culture[9,11]. In many private enterprises, particularly family-owned businesses, management styles often exhibit strong personal rule characteristics and centralized power structures. The transparency, standardized processes, and decentralization demanded by digital transformation may disrupt existing power structures and vested interests, triggering internal resistance and leading to phenomena like systems built but unused or data aggregated but not integrated[2]. Furthermore, severe information silos between departments hinder data circulation and sharing, further diminishing the effectiveness of digital systems.

Externally, private enterprises often occupy supporting roles in industrial chains, where digital upgrades depend on upstream-downstream coordination. If leading enterprises in the chain fail to open data interfaces or promote unified standards, SMEs are prone to becoming ecological islands[11], bearing the transformation costs alone while struggling to integrate into the digital ecosystem, ultimately resulting in ineffective transformation[7,8]. Furthermore, issues such as lagging development of industry-specific digital platforms and inadequate data security and privacy protection mechanisms also limit inter-enterprise data sharing and cooperation willingness, further exacerbating implementation challenges.

5. Pathways to Breakthrough: Evolutionary Paradigms and Safeguard Mechanisms for Digital Transformation in Private Enterprises

Based on an analysis of the triple dilemma and its interactive mechanisms, this study proposes a three-dimensional solution comprising a stepwise transformation pathway, an ecological synergy system, and targeted policy empowerment to help private enterprises overcome their transformation challenges.

5.1. Implementing a Tiered and Lightweight Transformation Approach at the Enterprise Level

At the enterprise level, implementing a phased and lightweight transformation pathway is key to addressing resource constraints and capability disparities[3]. Private enterprises must avoid blindly pursuing an all-at-once approach, instead adopting a gradual and flexible transformation strategy based on their digital foundation and resource conditions. Specifically, companies should first comprehensively identify pain points in critical areas such as technological innovation, safe production, green development, and brand cultivation, using these insights to guide their transformation planning. A phased, stepwise approach can be followed: initially introducing digital tools to digitize and intelligentize internal business and management processes, achieving efficient operational coordination at the foundational level. Subsequently, gradually deploying smart workshops and digital factories to advance production digitization, ultimately progressing toward comprehensive digital and intelligent upgrades across the entire production and operations chain[12]. This incremental process enables enterprises to steadily accumulate digital capabilities within resource constraints.

Additionally, enterprises can proactively establish open application testing environments by implementing internal demonstration projects, providing internal testing grounds for new technologies. Conducting small-scale pilots in specific business segments validates the adaptability and practical value of new technologies, thereby mitigating innovation risks stemming from market uncertainties and accumulating reliable experience for subsequent large-scale deployment[13]. This model of testing within controlled parameters before broader adoption enables private enterprises to explore optimal technological pathways suited to their needs at lower trial-and-error costs, progressively enhancing the robustness and success rate of their overall transformation.

5.2. Establish a Chain-based Collaborative and Ecosystem Empowerment System at the Industrial Level

At the industrial level, the success of digital transformation cannot rely on individual enterprises acting alone, it necessitates the construction of a collaborative and symbiotic ecosystem[11]. The key lies in leveraging the leading role of chain-leading enterprises, encouraging them to utilize technologies such as the internet, big data, and artificial intelligence to provide digital services to upstream and downstream enterprises. This drives the entire industrial chain toward enhanced quality and efficiency. For instance, Liaoning Province's initiative to have Shenyang Blower Works Group lead over a dozen industrial chain enterprises

in achieving collaborative transformation serves as a typical practice. Furthermore, a chain-based transformation model should be actively developed. This involves decentralizing resources, creating lightweight tools, building cross-chain data platforms, and implementing revenue-sharing mechanisms to overcome the limitations of isolated transformation. For instance, core enterprises could subsidize part of their suppliers' transformation costs or establish joint innovation funds to support technological breakthroughs. Concurrently, industry associations should spearhead the development of vertical-sector platforms, encouraging leading enterprises to open system interfaces. This enables small and medium-sized suppliers to integrate with procurement and inventory management systems. Forming digital consortiums among large, medium, and small enterprises further promotes deep integration of technology, data, and application scenarios. Furthermore, tailored strategies should be implemented based on enterprises' digital capabilities and customer types. Consumer-facing businesses should prioritize technologies like intelligent search and large language models, enterprise-facing businesses should deepen integration into supply chain digital systems, and digital-native enterprises should proactively empower industrial chain partners. This multi-tiered, differentiated transformation approach will comprehensively enhance the competitiveness of the industrial chain.

5.3. Enhance Targeted Empowerment and Systematic Support at the Policy Level

In supporting the digital transformation of private enterprises, the government should focus on optimizing policy provision to foster a more favorable external environment[6,10].

Specifically, this can be achieved by establishing a national-level fund for SME digital transformation, implementing differentiated subsidies by industry, expanding the coverage of tax incentives, and adopting mechanisms such as digital transformation vouchers to shorten enterprises' return cycles. Simultaneously, innovative digital financial tools should be actively developed, promoting credit loans based on data assets and incorporating enterprises' digital capabilities into credit assessments. Inclusive finance platforms should be cultivated to deliver more precise credit support. Additionally, governments can spearhead digital and intelligent transformation demonstration projects, creating replicable benchmark cases. These initiatives should systematically document pathways and experiences, generating standardized solutions for industry reference. Regarding data as a factor of production, accelerate marketization by standardizing transaction pricing mechanisms, establishing pilot data exchanges, and refining relevant laws and regulations to clarify property rights and security responsibilities. Finally, strengthen digital infrastructure development, prioritizing network coverage expansion in rural and central-western regions. Deepen industry-education integration to foster collaborative training between enterprises and educational institutions, cultivating digital talent aligned with industrial needs, thereby systematically solidifying the transformation support system.

6. Conclusion and Recommendations

The triple dilemma of digital transformation in private enterprises constitutes an interconnected and mutually reinforcing systemic challenge. Resolving this challenge requires coordinated efforts across three levels: enterprises, industries, and policies. At the enterprise level, a phased, lightweight transformation approach should be adopted to reduce trial-and-error costs. At the industry level, a chain-based collaborative ecosystem should be established to leverage the leading role of flagship enterprises. At the policy level, targeted empowerment and systemic support should be provided to foster a favorable transformation environment.

Future research may further explore differentiated transformation pathways for private enterprises across various industries and scales, as well as specific application models and

effectiveness evaluations of digital technologies like artificial intelligence and blockchain in their transformation processes. Concurrently, as the digital economy deepens, issues such as the market-based allocation of data as a factor of production and the refinement of digital governance systems will emerge as critical research directions.

The digital transformation of private enterprises not only concerns their own survival and development but also relates to the implementation of the national digital economy strategy and the construction of a modernized economic system. Only through multi-party collaboration and systematic advancement can private enterprises overcome transformation challenges and achieve high-quality development in the digital economy era.

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