

The Enterprise Digital Transformation in China

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Abstract. In the context of the digital economy, Enterprise Digital Transformation (EDT) is widely regarded as a key pathway to achieving sustainable development and enhancing competitiveness. This paper systematically reviews recent empirical studies on the digital transformation of Chinese enterprises, examining the driving roles of multiple factors such as policy support, digital finance, environmental pressure, and geographical location. It also summarizes the economic outcomes of EDT, including improvements in productivity, promotion of green innovation, enhancement of investment efficiency, and mitigation of greenwashing behavior. The findings suggest that the main drivers of EDT include policy and regulatory frameworks, financial mechanisms, and managerial attention to environmental issues, while its effects are primarily reflected in green performance and innovation efficiency. This study provides theoretical insights and policy implications for understanding the digital transformation pathways of enterprises in developing countries and for formulating high-quality development strategies driven by digitalization.

Keywords: Enterprise Digital Transformation, Policy and Regulation, Environmental Attention

1. Introduction

With the rapid evolution of digital technologies and the rise of the digital economy, Enterprise Digital Transformation (EDT) has emerged as a core pathway for firms worldwide to pursue strategic restructuring, managerial optimization, and sustainable growth. Driven by the widespread adoption of emerging technologies such as big data, artificial intelligence, blockchain, and cloud computing, enterprises are undergoing profound changes in their production methods, operational models, organizational structures, and value creation mechanisms. EDT is no longer a partial or technical upgrade, but rather a systematic process involving resource reallocation, strategic thinking transformation, and the restructuring of corporate governance. In particular, the structural shifts in global supply chains, labor organization, and consumption patterns triggered by the COVID-19 pandemic have further underscored the critical role of digital infrastructure and capabilities in enhancing enterprise resilience and innovation capacity.

In the Chinese context, enterprise digital transformation is not only a matter of micro-level strategic survival, but also deeply embedded in national macroeconomic development strategies. Since the release of Made in China 2025 in 2015, both central and local governments have introduced a series of supportive policies related to the digital economy, industrial internet,

intelligent manufacturing, and green transition, providing enterprises with institutional incentives and resource support. In 2022, the National Development and Reform Commission and other ministries jointly issued the 14th Five-Year Plan for Digital Economy Development, which set a target for the added value of core digital economy industries to account for more than 10% of GDP by 2025. This signaled that EDT has evolved from a voluntary business decision to a systematic national development strategy. Under the dual forces of policy support and market demand, Chinese enterprises have increasingly invested in digital infrastructure, digital talent, and R&D, driving comprehensive business process reengineering.

However, enterprise digital transformation does not follow a linear trajectory, nor is it a purely technology-driven process. Its momentum largely depends on the interplay of multiple factors, including policy environment, financial resources, industrial structure, corporate governance capacity, and the broader industry ecosystem. Enterprises of different ownership types, regional locations, industrial sectors, and resource endowments exhibit considerable heterogeneity in their transformation trajectories and outcomes. Moreover, EDT has yielded complex economic consequences, not only in enhancing productivity and innovation capacity but also in areas such as green governance, investment efficiency, and information transparency. In some cases, it has exacerbated inequalities through the emergence of a "digital Matthew effect" and digital divide. Therefore, understanding the driving factors and economic consequences of enterprise digital transformation, and clarifying its underlying mechanisms and heterogeneity, has become a critical theoretical and policy concern in the Chinese context.

This paper aims to systematically review representative empirical studies on the digital transformation of Chinese enterprises, focusing on its key drivers and impacts. Specifically, we construct an analytical framework that incorporates multiple dimensions including policy, finance, management, environmental pressure, and spatial location. Section 2 provides a review on the driving factors of enterprise digital transformation. Section 3 discusses the economic effects—examining how policy support, financial mechanisms, and managerial attention to environmental issues promote EDT, and how these transformations enhance productivity, foster green innovation, improve investment efficiency, and strengthen corporate governance. Section 4 concludes with a summary of the findings and directions for future research and policy design.

2. Driving factors of enterprise digital transformation

Policy and regulatory frameworks are widely recognized as one of the most critical external drivers of enterprise digital transformation in China. Numerous studies employing diverse methodologies have validated the incentive mechanisms and impact pathways of policy intervention in the digitalization process. For example, researchers utilize provincial-level digital policy data and applied hierarchical linear models to empirically examine the role of policy support in shaping enterprise digitalization. Policies were categorized into three dimensions—support for infrastructure, fiscal subsidies, and institutional environment optimization. The findings demonstrate that coordinated policies significantly enhance the adoption of digital technologies, particularly in regions with well-developed digital infrastructure [1,2]. Furthermore, the studies identified big data capability as a key mediating variable in the policy transmission mechanism, suggesting that policy interventions facilitate enterprises' data acquisition, analysis, and application capacities, thereby accelerating organizational restructuring and digital governance processes.

Similarly, SEZ policies significantly boost the adoption of technologies such as big data and cloud computing, mainly through infrastructure upgrades, resource agglomeration, and tax incentives. The impact is more pronounced for private and small- to medium-sized enterprises.

Moreover, the SEZ policy also improves the overall business environment and enhances firms' expectations about the returns and value of digital transformation [3].

Second, financial support serves as a crucial endogenous driver of enterprise digital transformation. Scholars investigate how digital finance influences digital transformation. The empirical results show that digital finance effectively alleviates corporate financing constraints and broadens financing channels, thereby significantly promoting investment in digital technologies. Heterogeneity analysis reveals that this mechanism is more pronounced for small and medium-sized enterprises (SMEs) and non-state-owned enterprises [4]. Besides, other scholars find that green financial innovation significantly promotes the adoption of digital technologies such as cloud computing and big data. This effect operates through enhanced supply chain bargaining power and improves dynamic capabilities. The impact is more prominent among labor-intensive firms, enterprises with lower ESG performance, and small and medium-sized new energy firms, suggesting that green finance not only accelerates digital transformation but also enhances firms' green governance capabilities [5,6].

Third, managerial attention to environmental issues has been proven to be a critical factor driving enterprise digital transformation. There are empirical findings showing a significant positive association between managerial climate attention and the level of digitalization within enterprises, suggesting that environmentally sensitive executives are more inclined to adopt digital technologies—such as big data analytics and intelligent monitoring—for green governance. However, this positive relationship is weakened for firms under financial constraints or those operating in heavily polluting industries [7]. Another study shows that a one standard deviation increase in climate risk corresponds to an average increase of approximately 0.0314 standard deviations in the level of digital transformation. The underlying mechanisms include reduced investment in traditional fixed assets and increased business diversification, making firms more reliant on digital systems for risk management [8,9]. Moreover, the effect is more pronounced in non-state-owned firms, financially constrained firms, and those in energy-intensive sectors. These findings offer novel insights into how digital transformation serves as a proactive strategy for enterprises to respond to climate change and regulatory pressure, and they provide strategic guidance for the design of green digital policies [10].

3. The effects of enterprise digital transformation

First, enterprise digital transformation is widely recognized for its potential to enhance total factor productivity (TFP) and technological innovation performance. On one hand, by incorporating intelligent manufacturing, industrial internet, and data-driven decision-making mechanisms, firms significantly improve internal resource allocation efficiency and achieve more refined and efficient operational processes [11,12]. On the other hand, digitalization enhances cross-departmental collaboration and university-industry joint R&D capabilities, promoting a shift from “point-based innovation” to “systematic innovation.” Some studies have found that in industries with high technological spillover rates, firms with a higher degree of digitalization tend to have greater R&D output and more patent applications, suggesting that digital tools strengthen firms' ability to absorb and re-create knowledge [13]. Additionally, digitalization improves firms' responsiveness to market changes, facilitating faster commercialization of innovation outcomes and forming a positive feedback loop of “data–capability–innovation” [14].

Second, with the deepening of the green development agenda, digital transformation is increasingly demonstrating its potential in promoting corporate green governance and sustainable development. Existing studies suggest that digital technologies improve the transparency and

auditability of environmental information, enabling regulators and the public to better supervise corporate green practices, thus narrowing the room for “greenwashing” [10,15]. Meanwhile, digital tools allow firms to more effectively monitor energy consumption and emissions, implement green supply chain management, and conduct quantitative evaluations of environmental performance through carbon footprint tracking systems [16]. Research further indicates a synergistic effect between digital and green transformation, which is particularly evident in sectors such as new energy and high-end manufacturing. Under the “Dual Carbon” strategy, firms with higher levels of digitalization tend to exhibit better performance in sustainability indicators, indicating that digital transformation is gradually evolving from an efficiency-enhancing tool to a governance-oriented instrument [17].

Third, digital transformation also generates considerable economic benefits at the enterprise level. By streamlining operational processes, reducing transaction costs, and optimizing resource allocation, digital technologies enhance production efficiency and lower marginal costs. Empirical studies show that firms adopting digital tools such as cloud computing, enterprise resource planning (ERP), and intelligent logistics systems tend to exhibit higher levels of operational efficiency and profitability [18,19]. Furthermore, digitalization facilitates more precise demand forecasting, flexible production, and real-time decision-making, enabling firms to better adapt to market fluctuations and reduce inventory and coordination inefficiencies. At the strategic level, digital transformation opens new business models—such as platform-based services, digital supply chains, and data monetization—which not only expand firms' revenue sources but also enhance their market competitiveness and resilience [20]. These economic returns provide strong incentives for enterprises to invest in digital infrastructure and capabilities, reinforcing a self-reinforcing cycle of transformation and performance improvement [21].

4. Conclusion

In summary, enterprise digital transformation has emerged as a key pathway for achieving high-quality economic development in China, driven by a synergy of policy, financial, environmental, and spatial factors. Policy guidance provides institutional foundations and resource support, digital finance alleviates traditional financing barriers, while environmental pressures and spatial proximity jointly contribute to a transformation ecosystem that integrates both “soft” and “hard” elements. On this basis, digitalization not only enhances productivity and innovation capacity but also demonstrates significant potential in advancing green governance and sustainable development. It is increasingly becoming an essential tool for enterprises to cope with external uncertainties and achieve strategic upgrading.

However, the current process of digital transformation still faces multiple challenges. On the one hand, firms exhibit substantial heterogeneity in their digital capabilities and outcomes, constrained by factors such as ownership structure, industry barriers, and geographic location. As a result, many small and medium-sized enterprises (SMEs) and firms in underdeveloped regions have yet to fully benefit from the “digital dividend.” On the other hand, issues related to data security, privacy protection, and platform governance pose growing challenges to the long-term sustainability of digital transformation. Moreover, the interaction mechanisms between digital transformation and green transition or corporate social responsibility remain underexplored, and the relevant theoretical frameworks require further expansion and refinement.

Future research could be advanced in the following directions. First, more attention should be paid to the micro-level identification of transformation mechanisms by integrating firm-level data with multi-source heterogeneous information, to better reveal how policies and markets jointly

influence the evolution of enterprise strategies. Second, scholars should examine the long-term performance outcomes and potential risks of digital transformation. Third, future studies should further explore the integration paths between digitalization and greening, focusing on how technological tools can be leveraged to strengthen corporate sustainability governance. From a policy perspective, differentiated and targeted support mechanisms should be designed based on firm characteristics and regional conditions, in order to achieve the dual goals of “precision transformation” and “digital equity,” thereby contributing to a more inclusive and sustainable digital economy ecosystem.

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